ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

McGraw-Hill Co.

MARCH 1946

A WIRE HAS 2 ENDS
Where do you get your electric service? Out of a wire, of course. The end of the wire in your house is connected with the lights, your refrigerator, range, water heater, washing machine, or your toaster—to all of your electrical appliances. The other end is connected with the Edison Company.
The Edison Company is an independent company with more than 50 years of sound experience in the very technical electri-
"Know-how"
ELECTRICAL SERVICE
Gathering "know-how" is a continuing process. Edison has been adding to its electrical "know-how" for more than 50 years. Every year in the history of the Edison Company has its record of some outstanding development of electric generation, transmission and distribution service.
The engineering and construction tasks that made these advances possible were revolutionary and tremendous—free enterprise jobs. As its territory has grown, so has the company expanded its service to provide the electrical strength for community development.
Ninety-three thousand stockholders and 3,500 employees are this "company" of elec-
owners and operators.
Leerie
THE LAMPLIGHTER
Do you remember the poem
many years ago about the little
for Leerie the Lamplighter
lantern and his ladder, to light
"For we are very lucky with
And Leerie stops to light it as
Edison has been Southern California
than fifty years. It is the work of
the lamps of 650,000 customers
electricity they need for every
And they do a good job of it.
trical service has kept the compa
SOUTHERN CALIFORNIA
"Selling" the other side of the outlet
Edison electrical service is powerful ammunition in the selling of appliances in Southern and Central California. Prospects appreciate the advantages of electrical appliances more when they know they can always depend upon good, low cost electrical service for operating them.
The advertisements shown above—part of a series now appearing in newspapers throughout Edison territory—tell appliance prospects about the Edison Company and why its service is the best available anywhere. This is a story that belongs in the "sales kit" of every appliance dealer!
Edison

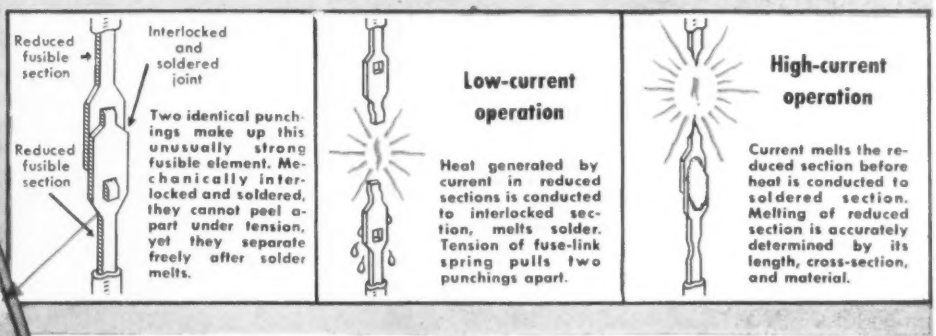
ELECTRICAL WEST (with which is consolidated The Journal of Electricity), March, 1946. Vol. 96, No. 3. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, 4, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rates—U.S., U.S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $4, 2 years; $5, 3 years. Other

HERE'S A NEW FUSE LINK THAT'S REALLY DIFFERENT

It's a double-duty fuse that reduces surge blowing and improves overcurrent protection

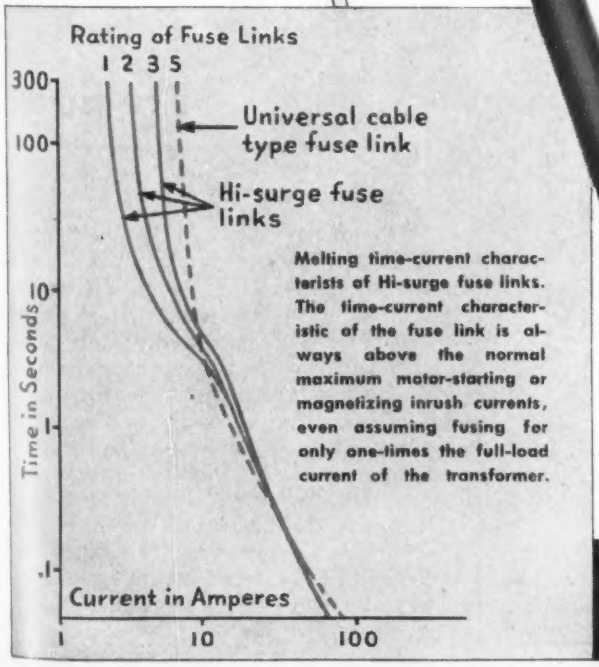
For flip-open cutouts

For expulsion-type cutouts


Reduced fusible section
Interlocked and soldered joint
Reduced fusible section
Two identical punchings make up this unusually strong fusible element. Mechanically interlocked and soldered, they cannot peel apart under tension, yet they separate freely after solder melts.
Low-current operation
Heat generated by current in reduced sections is conducted to interlocked section, melts solder. Tension of fuse-link spring pulls two punchings apart.
High-current operation
Current melts the reduced section before heat is conducted to soldered section. Melting of reduced section is accurately determined by its length, cross-section, and material.

Cutaway view, showing construction

HI-SURGE FUSE LINKS



Melting time-current characteristics of Hi-surge fuse links. The time-current characteristic of the fuse link is always above the normal maximum motor-starting or magnetizing inrush currents, even assuming fusing for only one-times the full-load current of the transformer.

NOW, for the first time, it is no longer necessary to choose between *proper overcurrent protection* and a *low rate of fuse blowing* caused by lightning and other surges. *You can have both* because of the double-duty characteristics of the new G-E Hi-surge fuse links.

Available in low-current 100% N-ratings of 1, 2, and 3 amperes, each having a surge-blowing characteristic of a ***5-ampere*** conventional fuse link.

By using them at transformer installations where you have been using a 5-ampere minimum primary fuse, you can improve overcurrent protection and keep the same freedom from blowing by motor-starting, magnetizing inrush, or lightning surges. Rechecking co-ordination with line sectionalizing devices is unnecessary.

By using them at transformer installations where 1-, 2-, or 3-ampere fuses have previously been used, you can reduce blowing by surges and keep the same overcurrent protection. And, here again, usually without restudying fuse co-ordination.

These new fuse links are mechanically and, usually, electrically interchangeable with universal cable-type or flip-open fuse links now in service.

We shall be glad to send you complete descriptive and application information on this revolutionary advance in fuse-link design. Write for Bulletin GEA-4436. *General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

405-16-5254

ELECTRICAL WEST

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Cover Photo: A typical crowd in the busy Spring Market exhibits at Western Merchandise Mart, San Francisco.

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco 4, Calif.

Please change my address

From .....

To .....

Signed .....

People

J. J. Deuel

arrived in California following another war, the Spanish American. He had been discharged from the Navy and had come West from Ohio, via Florida. He has been in his present position as director of the Public Utilities Department of the California Farm Bureau since 1922 and previously was in the same sort of work in Kern County. A farmer himself, Deuel owns and supervises an acreage near Bakersfield. He writes this issue (p. 55) on some misleading statements issuing from Washington and elsewhere on the subject of cheap power.

Scott Beamer

has returned from the late war—wherein, among other things, he took a proximity fuse team to Europe—and has taken a careful look at what's happened to some of the wiring he supervised when he was electrical engineer with Region IX, Farm Security Administration. Collaborating with him in summing up the lessons learned (p. 64) is Ralph A. MacIntyre, district electrical engineer, Production and Marketing Administration, Labor Branch, U. S. Department of Agriculture.

Preview

Manufacturers' Directory

One of the most useful and referred to issues of ELECTRICAL WEST each year is the directory issue. It will appear as customary in the April issue, expanded and improved. More than ever will it serve this year of changes in representatives, distributors and agencies. The number of new companies alone is astonishing to the editors compiling it. With the companion directory, "Where to Buy in the West," it forms the basis for a year-round service performed by ELECTRICAL WEST by mail and by phone answering queries as to who in the West is agent for or representative of such-and-such a brand.

When Betty Crocker talks about COFFEE MAKING millions of women will listen!

America's millions of homemakers can look forward to some exciting news from Betty Crocker . . . about a new and better method of making coffee . . . with the General Mills Automatic Electric Coffeemaker.

It operates on a thoroughly tested new principle . . . made possible by a unique General Mills development—the "Magic Motor." The new brewing principle produces a richer coffee flavor because more of the volatile flavor-making coffee oils can now be extracted in less brewing time.

When women hear this news from Betty Crocker . . . when they hear about the other exclusive advantages of the General Mills Automatic Coffeemaker . . . they'll *act* . . . they'll *buy*. Women know and trust Betty Crocker as the world's most helpful home service authority. They'll want the coffeemaker Betty Crocker tells about . . . just as they now want—and *buy* —hundreds of millions of packages of other General Mills products recommended by Betty Crocker.

How the Magic Motor works

On the end of the rod in the man's hand is a revolving disc equipped with pumping flanges. It is held over the magnetic field of the new General Mills Magic Motor, but is not connected with any source of mechanical power whatsoever.

But . . . turn on the electricity that creates the magnetic field and the pump rotor on the end of the rod starts to whirl, all alone and by itself in the air. Even submerged in water it will spin swiftly and powerfully.

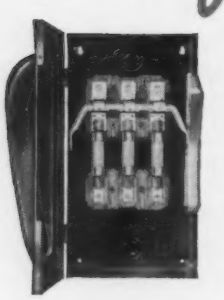
These sketches illustrate the Magic Motor principle and suggest its importance to coffeemaker design. For only through the development of the Magic Motor could all the advantages of the General Mills Coffeemaker be offered to American Homemakers.

BETTY CROCKER IS A REGISTERED TRADE MARK OF GENERAL MILLS, INC.

GENERAL MILLS, INC., HOME APPLIANCE DEPARTMENT • MINNEAPOLIS 13, MINNESOTA

Vacu-Break SAFETY SWITCH with "CLAMPMATIC" CONTACTS

Sizes for Every Switch Job



For greater safety and dependability, longer life and lower upkeep costs, leading plants the country over depend on BullDog Vacu-Break Safety Switches.

Designed in a wide variety of sizes and types with capacities ranging from 30 to 1200 amperes, standard models of this famous switch are available for every industrial requirement.

No other safety switch has "Clampmatic" contacts, tight as a bolted connection in the ON position, to reduce heating—the Vacu-Break principle of arc suffocation to snuff out destructive arcs as quickly as they form—new simplified operating mechanism in modern streamlined cabinet.

Talk to expert BullDog field engineers about the electrical distribution problems in your plant. Or write us for literature.

BULLDOG

ELECTRIC PRODUCTS COMPANY

BOX 177, R. PK. ANNEX, DETROIT 32, MICHIGAN. BullDog Electric Products of Canada, Ltd., Toronto. Field Offices in All Principal Cities.

Also Manufacturers of

SafToFuse Panelboards—Switchboards—Circuit Master Breakers—Universal Trol-E-Duct, for flexible lighting—Industrial Trol-E-Duct, for movable "loads"—BUS-tribution DUCT, for "Plug-In" Power.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue
Portland, Oregon, Tel. Garfield 2844

Safety Switchboard Company
1445 Stevenson St.
San Francisco, Calif., Tel. Hemlock 2470

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street
Los Angeles, Calif., Tel. Jefferson 2224

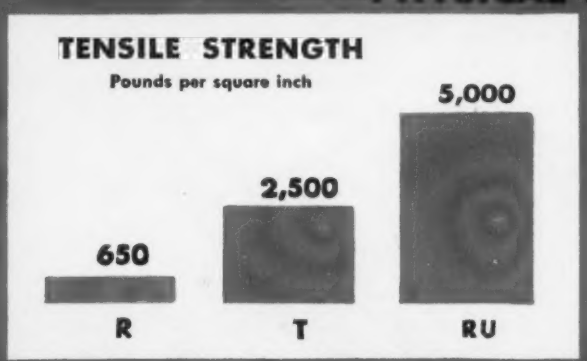
COMPARE Laytex (RU)

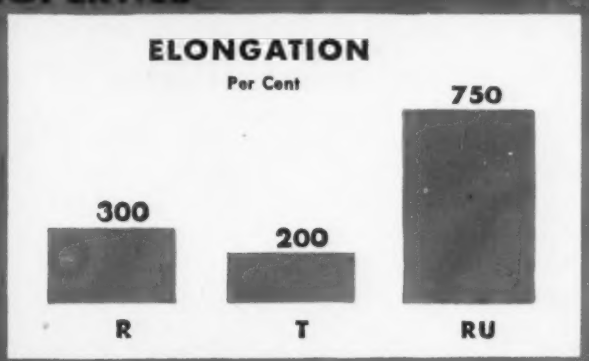
Reg. U. S. Trade Mark

Electrically and Physically

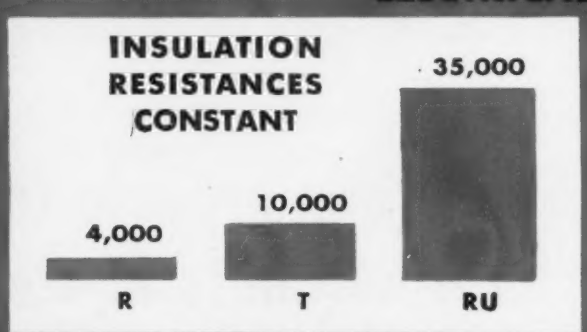
(60° Operation)

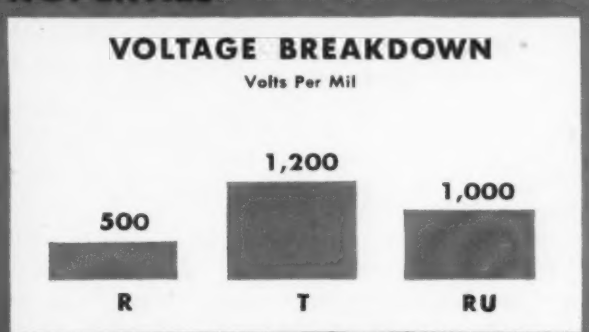
PHYSICAL PROPERTIES





ELECTRICAL PROPERTIES





THREE TYPES of building wire are authorized under the new Electrical Code. These are:

R—Used by the Industry since its inception. The copper conductor has a Code rubber insulation and fibrous overall cover.

T—A copper conductor with VINYLITE (a synthetic compound) insulation.

RU—LAYTEX. This type has a copper conductor, *natural rubber insulation* and fibrous cover.

The charts above show the wide margin by which LAYTEX leads in physical and electrical qualities. This is America's lightest weight, smallest diameter, natural rubber covered wire. *Now available without restriction.*

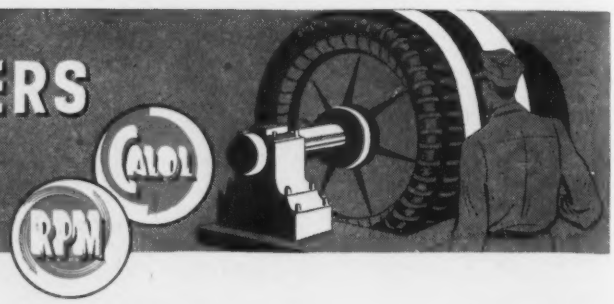
SERVING THROUGH SCIENCE

Nothing Insulates like Rubber

UNITED STATES RUBBER COMPANY

1230 AVENUE OF THE AMERICAS • ROCKEFELLER CENTER • NEW YORK 20, N. Y.

STANDARD ENGINEERS NOTEBOOK

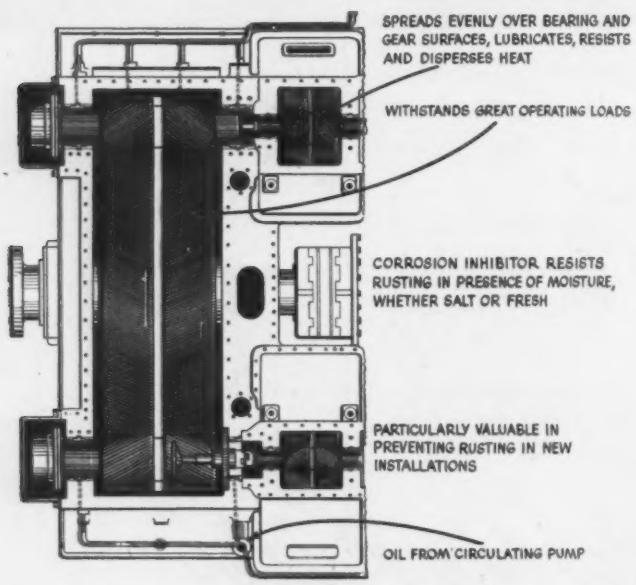


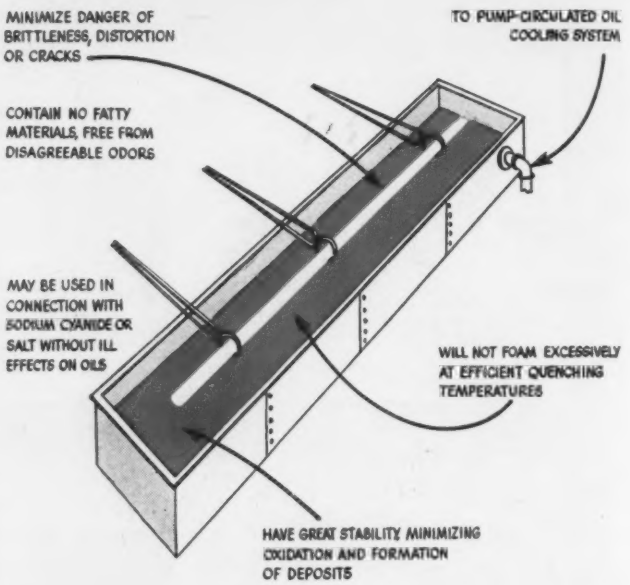
Inhibited turbine oils prevent rust damage

The usual danger of rusting when new installations of double reduction steam turbines are first charged can be eliminated by using Calol OC Turbine Oil 19. It will also give turbine and gears full protection throughout their lives.

Calol OC Turbine Oil 19 is a compounded oil, made from selected crudes. It contains a highly effective rust inhibitor which protects against both fresh and salt water. In official tests, steel strips immersed in mixtures of Calol OC Turbine Oil 19, fresh water and synthetic sea water showed no sign of rusting after 48 hours. Calol OC Turbine Oil 19 also contains an efficient oxidation inhibitor.

The high film strength of Calol OC Turbine Oil 19 provides a wear-reducing cushion that carries the heavy weight imposed on turbine bearings. Minimum wear prevents rotor misalignment trouble. Calol OC Turbine Oil 19 is non-corrosive and separates rapidly from water with little sludge formation.


SPREADS EVENLY OVER BEARING AND GEAR SURFACES, LUBRICATES, RESISTS AND DISPERSES HEAT
WITHSTANDS GREAT OPERATING LOADS
CORROSION INHIBITOR RESISTS RUSTING IN PRESENCE OF MOISTURE, WHETHER SALT OR FRESH
PARTICULARLY VALUABLE IN PREVENTING RUSTING IN NEW INSTALLATIONS
OIL FROM CIRCULATING PUMP


MINIMIZE DANGER OF BRITTLENESS, DISTORTION OR CRACKS
TO PUMP-CIRCULATED OIL COOLING SYSTEM
CONTAIN NO FATTY MATERIALS, FREE FROM DISAGREEABLE ODORS
MAY BE USED IN CONNECTION WITH SODIUM CYANIDE OR SALT WITHOUT ILL EFFECTS ON OILS
WILL NOT FOAM EXCESSIVELY AT EFFICIENT QUENCHING TEMPERATURES
HAVE GREAT STABILITY MINIMIZING OXIDATION AND FORMATION OF DEPOSITS

Stable oils produce uniform hardness in steel

Because they retain their original viscosities in continued use, Calol Quenching Oils maintain a constant quenching speed and produce uniform hardness in steels. They have a high resistance to oxidation and contain no fatty oils to produce disagreeable vapors.

Calol Alloy Quenching Oil consistently and quickly produces higher hardness in alloy steels. Its unusual cooling power is based on what is believed a new principle. Unlike water, it eliminates the chance of brittleness, distortion or cracks.

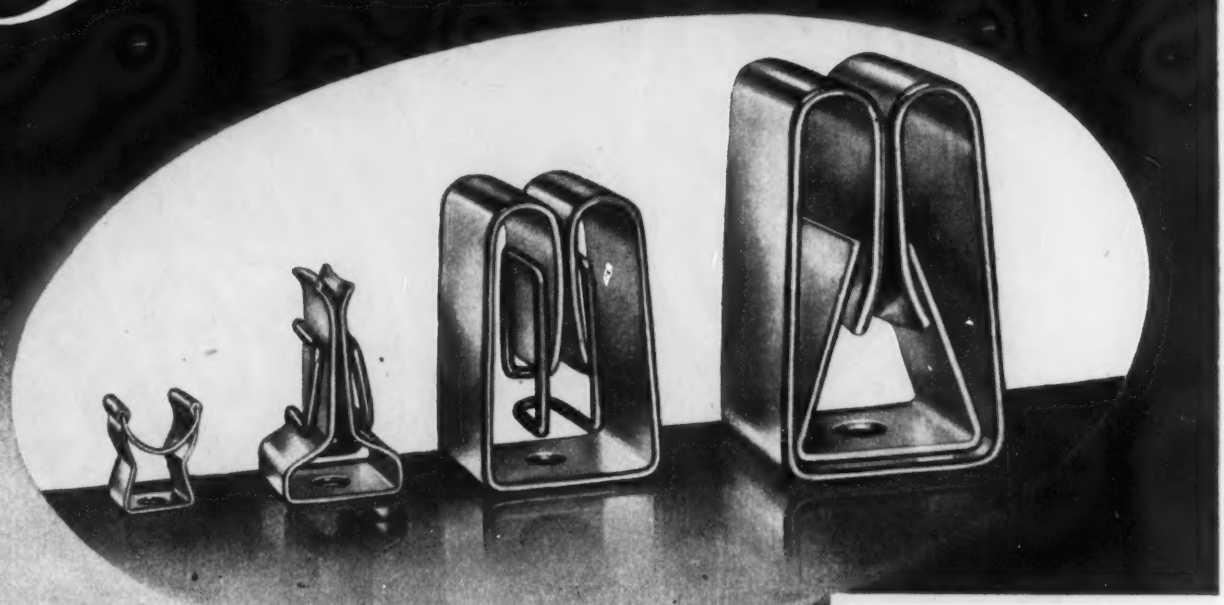
Calol Quenching Oil is recommended for high-carbon steels. Made from selected mineral oils covering a wide boiling range, it provides the moderate cooling-rate desirable for these steels.

For suggestions on the use of Calol Quenching Oils, information about machining various metals and the lubricants required, write for the free booklet: "Calol Cutting Fluids."

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif., or The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.

FOR EVERY JOB A **STANDARD OF CALIFORNIA** TEST-PROVED PRODUCT

Positive Pressure FUSE CLIPS

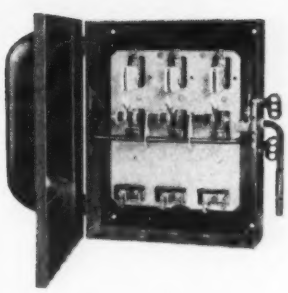


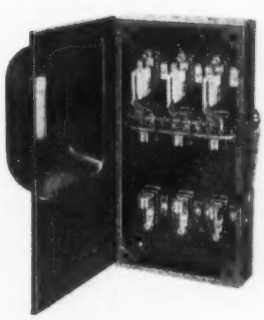
. . . an exclusive feature of all Square D Safety Switches

What do these fuse clips add to overall safety switch performance? Plenty!

- They reduce heating at contact points by 60%, compared with conventional type clips.
- Copper instead of bronze, they afford substantially more conductivity.
- Lower contact resistance because of higher contact pressure.
- Design permits easy insertion and removal of fuses, notwithstanding the higher contact pressure.
- The Positive Pressure is automatic. It requires no bolts or clamps. It is immune to the loosening effect of vibration, wear or thread stripping.

This is one of many basic features which have placed Square D safety switches in the number one preference spot.





Write for BULLETIN 500 which describes Square D's complete safety switch line and all its features. Address Square D Company, 1320 East 16th Street, Los Angeles 21, Calif.

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

G-E LAMPS
G-E LAMPS
GENERAL

Coming...

NEW CARTONS FOR ALL G-E LAMPS!

THEY'RE on the way! Brand new packages for *all* General Electric Lamps! Created by a prominent package designer in cooperation with G-E merchandising experts, they have been developed to help you make more money selling a high quality, nationally-known brand of lamps.

The new packages—featuring a brilliant, eye-catching design—will be introduced into the entire line of G-E Lamps. First to reach you will be the new cartons for 25 to 100 watt standard G-E Lamps, Heat Lamps and Fluorescents. Others will be added immediately as conditions permit.

Display—feature—and sell more G-E Lamps in these exciting new cartons! It's simple—with these 4 new sales advantages:

1. **Quicker Identification**—more striking display of G-E trademark does it. Gains full sales benefit from customers' high preference for lamps made by General Electric.
2. **Smart New Design**—gives increased attraction value to windows, counters or shelf displays. Sells G-E Lamps on sight.
3. **More Colorful Appearance**—brilliant blue and yellow colors add plenty of eye-appeal with buy-appeal and help make quick sales.
4. **Family Tie-In.** Same basic design now introduced on all G-E Lamps, including heat lamps, sun lamps, fluorescents and others. All are quickly identifiable, yet each bears standard G-E package design.

Visit the International Lighting Exposition, April 25-30, Hotel Stevens, Chicago, Ill. See the G-E display, Booth Nos. 27-32 incl.

G-E LAMPS

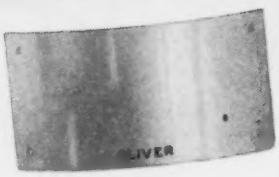
GENERAL ELECTRIC

OLIVER
GUYING MATERIALS

FROM THE COMPLETE LINE
OF **OLIVER**
POLE LINE MATERIALS

STRAIN PLATES

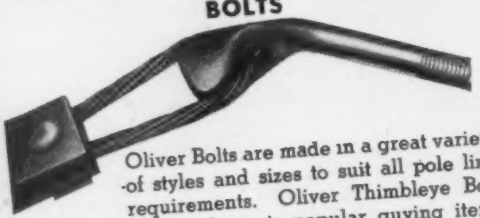
Provide wide bearing surface that protects the pole against cutting by guy strands. Several types available.



GUY HOOKS

Supports guy strand and prevents slipping. Half-oval steel protects strand. Made in light, medium and heavy sizes, in addition to many types of special Oliver Guy Attachments.

BOLTS



Oliver Bolts are made in a great variety of styles and sizes to suit all pole line requirements. Oliver Thimbleye Bolt shown above is popular guying item.

GUY CLAMPS

Made in all sizes and capacities required for guying service. Sturdy construction, accurately fitting.

STRAIN INSULATORS

Made from high quality dry process or wet process porcelain, with well-rounded corners and surfaces. Complete line for guying and other services.

ANCHOR RODS

This important feature of guying has been given careful attention by Oliver engineers. The various types of Oliver Anchor Rods are described in the complete Oliver Catalog.

1 they are PROPERLY DESIGNED

Oliver experience dates from the very beginning of the pole line hardware industry—and today Oliver designs reflect the most modern engineering practice.

2 they are WELL MADE

Manufacturing processes employed by Oliver include the most up-to-date methods of forming and finishing. Metal parts are protected by galvanized coatings.

3 they are DEPENDABLE AND ECONOMICAL

Users find that Oliver Pole Line Materials represent highest quality—providing long life and economical service. Always a good investment.

For many other items see **OLIVER CATALOG NO. 43**

OLIVER
IRON AND STEEL
CORPORATION
South Tenth and Muriel Streets
Pittsburgh 3, Pennsylvania

SOLD THROUGH ELECTRICAL WHOLESALERS

Once Again Available...
OKONITE INSULATION

made with wild Up-River Fine Para Rubber

Here is important news — the return of Okonite insulation — made possible because the use of natural rubber has been authorized for those severe service conditions where wires and cables are to be installed in wet locations.

Back in November, 1943, when the supply of natural rubber was withdrawn, The Okonite Company announced that it would no longer be able to provide Okonite insulation because this high-grade compound could not be made without a particular kind of natural rubber — wild Up-River Fine Para Rubber.

Now, with the gradual return of natural rubber, the latest W.P.B. rubber order recognizes that certain vitally important needs for rubber must be served first. One of these is for wires and cables operating in wet locations, an installation condition where many years of service experience have shown Okonite rubber insulation to be outstanding.

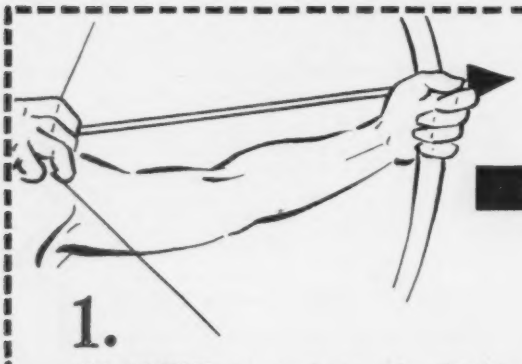
Therefore, Okonite insulation made with wild Up-River Fine Para Rubber, applied to the conductor by the Okonite strip insulating method and vulcanized in a continuous metal mold, is once again available to the electrical industry for these restricted — but most important — applications. *Okonite insulation is exactly the same compound it always was, possessing the same characteristics which years of experience have confirmed . . .* its exceptionally long life, its ability to retain tensile strength and elasticity, its high electrical values. The Okonite Company, Passaic, New Jersey.

A complete story on Okonite insulation is available in Research Bulletin 101 which includes engineering details, illustrations of methods used to safeguard performance, and records of electrical tests.

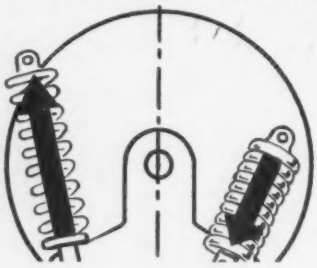
OKONITE OKONITE SINCE 1878
insulated wires and cables 440E

The "Quick-Break" Principle Explained

WHAT IT IS — HOW IT IS USED IN ALLIS-CHALMERS 5/8% STEP REGULATORS TO GIVE YOU CLOSER REGULATION AT LOWEST POSSIBLE COST



ENERGY STORED-UP

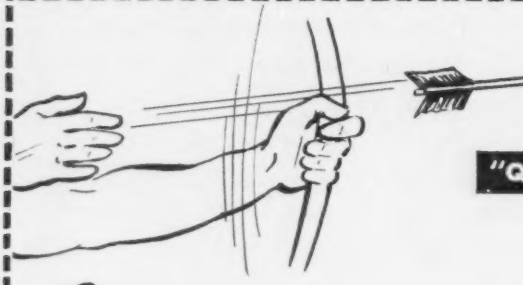


1.

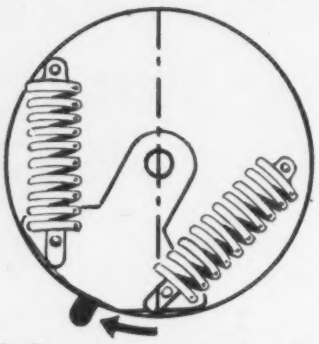
AN ARCHER is employing the "Quick-Break" principle when he stores up energy in his bow, by gradually pulling back the bowstring. Energy thus stored in the bow is available for sudden release.

2.

SIMILARLY, The Allis-Chalmers tap-changing mechanism applies the "Quick-Break" principle, by gradually storing up energy for a quick tap change, in a pair of *balanced* driving springs.



"QUICK-BREAK" RELEASE



3.

UPON RELEASE of the bowstring, all of the stored energy in the archer's bow is applied instantly. This "Quick-Break" principle is just the opposite of the slow-breaking principle employed by the javelin-thrower, who applies energy as it is generated.

4.

IN THE A-C tap-changing mechanism, quick release of built-up spring energy separates contacts with a *snap action,* in contrast to slow-breaking types of mechanism. Since the arc exists for only a *brief instant,* arcing doesn't burn or pit contacts.

"QUICK-BREAK" PRINCIPLE MEANS LOW MAINTENANCE, EXCEPTIONALLY LONG CONTACT LIFE

WITH ARCING reduced to a minimum by "Quick-Break" contact separation, contacts on Allis-Chalmers 5/8% Step Regulators may be expected to last as long as the regulator is in use. As a matter of record, no current-carrying contact has ever been replaced on an Allis-Chalmers 5/8% Step Regulator, due to deterioration in normal service.

OTHER LOW MAINTENANCE PRINCIPLES: 1) Unit construction of A-C 5/8% Step Regulators, eliminates 78 bolted connections; 2) Oil immersion of all moving parts keeps parts dust-free, eliminates need for lubrication; 3) Feather-Touch control, with voltage integration, eliminates holding coils, sealing-in switches.

Get the full story on economical 5/8% Step Regulators for all voltages by writing for Bulletins B6056A and B6065, ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

1930

HEAR THE BOSTON SYMPHONY: *Saturday, American Broadcasting Co.*

Photograph of sediment consisting of rust particles, chips of metal, carbon and gum removed from the lube oil system of a large steam turbine. Proper cleaning of a turbine's lube oil system before the initial charge of lubricating oil is installed can save serious trouble.

SHELL CLEANING PROCEDURE

makes it easy—makes it sure!

• A small amount of sludge and dirty oil acts on clean, new oil like a rampaging disease—can shorten its life 50 to 75%. Chemists call it the auto-catalytic effect—sludge, metal particles and rust acting as catalysts to hasten the oxidation of new oil.

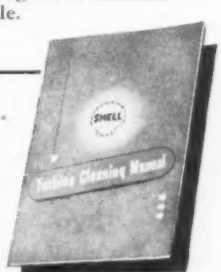
Before you add that next batch of make-up oil to your system, be sure to get details about Shell's Turbo Cleaner and the Shell Cleaning Procedure. *You may decide to take a fresh start.*

Remember, too, this procedure should be followed before putting the first charge of oil in *new equipment.* As insurance, it's cheap enough to know that your turbine is free of contaminants such as slushing compound, run-in oil, and metal chips.

Call the Shell Lubrication Engineer, or write for your copy of the Turbine Cleaning Manual. Shell Oil Company, Incorporated, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California.

SEND FOR THIS BOOKLET NOW!

Every turbine owner and operator should have a copy. It contains full details on the Shell Turbo Cleaner and Shell Cleaning Procedure, and shows you how to get peak efficiency, lower operating costs.



SHELL

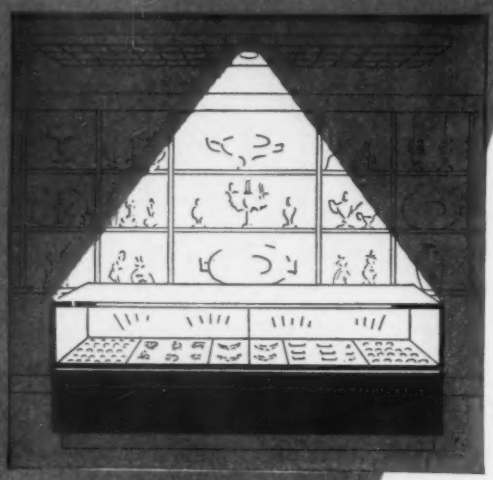
SHELL TURBO OIL

Leader

Eye Appeal
Buy Appeal

with the New Leader "Officer"

DIRECLITE



It's a well-known rule of merchandising that to *sell* more you must *show* more. Now, with Leader's new DIRECLITE, you can spotlight and focus attention to a given section of your store or a particular item of merchandise. Used in combination with the well-known "Officer" Unit, DIRECLITE gives a selling power unequalled in lighting history.

Previous purchasers will be glad to know DIRECLITE can be easily installed for use with their present equipment.

Leader

Only Better Electrical Wholesalers distribute Officer and Direclite Units. There is a Leader Representative in your area. See him *today*, or write

ELECTRIC MANUFACTURING CORP

6127 NORTH BROADWAY . . . CHICAGO 40, ILLINOIS

WEST COAST FACTORY...2040 LIVINGSTON STREET, OAKLAND 6, CALIFORNIA

NOW A *Super* CORONOL CABLE

NEW BUTYL-BASE COMPOUND (GRI-8380)

for high-voltage cable insulation

BEATS RUBBER 9 WAYS

Remember prewar CORONOL—that fine high-voltage, ozone-resistant, rubber-like cable? Now, the best of oil-base natural-rubber insulation—as used in prewar CORONOL cables—has a successor that gives better results on every count important to cable life.

This new G-E insulation has a custom-built molecular structure, the base of which is butyl (synthetic) rubber. It is blended, compounded, and applied to the conductor by methods derived from G-E's full-range research. It is free from the "unsaturated" chemical bonds that make natural rubber subject to oxidation and aging. Thus, it is essentially inert to the action of ozone, sunlight, and oxidizing agents, and exceptionally resistant to acids, alkalies, and heat. (See table)

FIGURES THAT MEAN LONGER CABLE LIFE

PROPERTIES	SUPER CORONOL (Typical values)	CORONOL (Typical values)	IPCEA* REQUIREMENTS
Original Physicals			
Tensile lbs/sq in.	750	550	450
Per cent elongation	600	300	250
7 days 70C Geer Oven			
Tensile lbs/sq in.	700	450	400
Per cent elongation	525	225	200
48 hours 70C Oxygen Bomb			
Tensile lbs/sq in.	675	475	400
Per cent elongation	525	240	200
Cold Bend	—60 C	—15 C	—10 C
Power Factor	.010	.030	.050
Ozone Resistance	very good †	good	3 hours

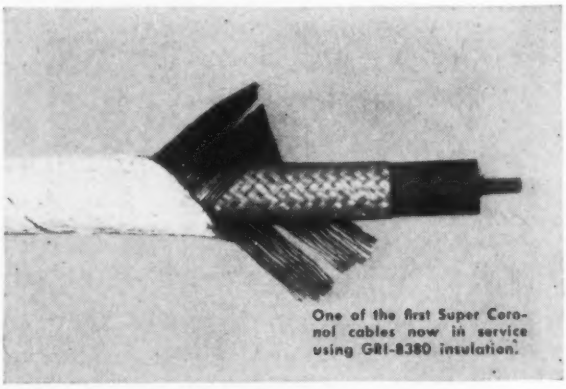
Long-Lived in Field Tests

In the field, as well as in the laboratory, the CORONOL cable made with the new butyl-base insulation has proved itself in a number of installations since early in the war.

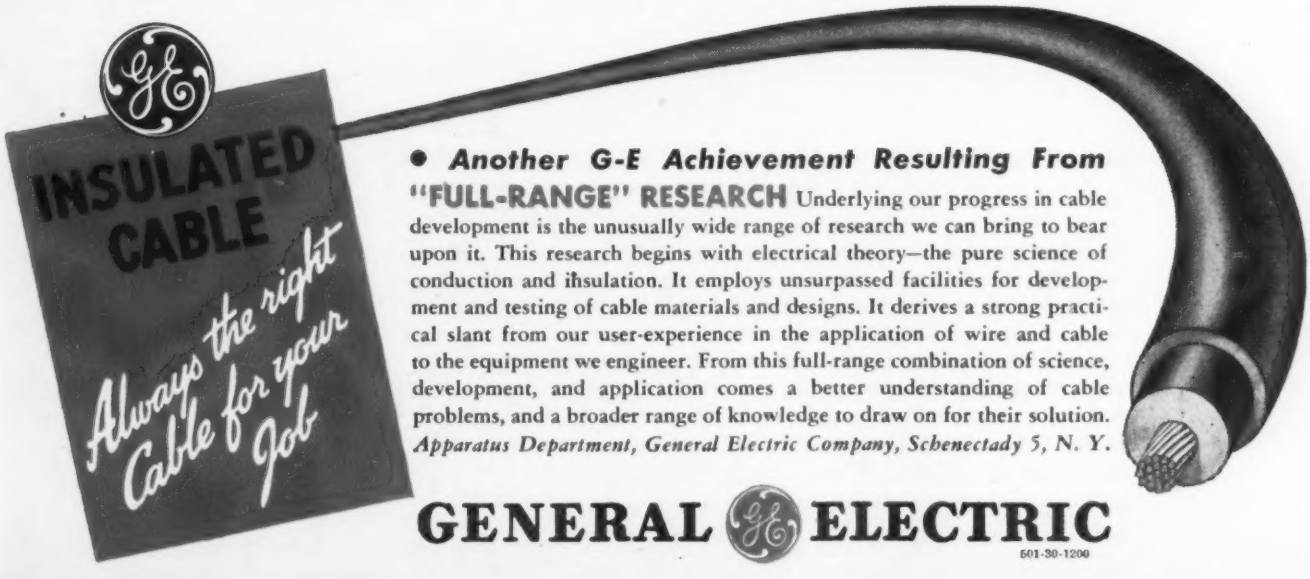
Of equal importance for the future are possibilities for extending the use of the new butyl-base compound to other insulated cables for a wider range of applications, higher voltages, and more extreme limits of temperature.

*Insulated Power Cable Engineers Association Specification for Ozone-Resistant Type Insulation

†Many samples have withstood 72 hours exposure



One of the first Super Coronol cables now in service using GRI-8380 insulation.



• ***Another G-E Achievement Resulting From "FULL-RANGE" RESEARCH*** Underlying our progress in cable development is the unusually wide range of research we can bring to bear upon it. This research begins with electrical theory—the pure science of conduction and ihsulation. It employs unsurpassed facilities for development and testing of cable materials and designs. It derives a strong practical slant from our user-experience in the application of wire and cable to the equipment we engineer. From this full-range combination of science, development, and application comes a better understanding of cable problems, and a broader range of knowledge to draw on for their solution. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

501-30-1200

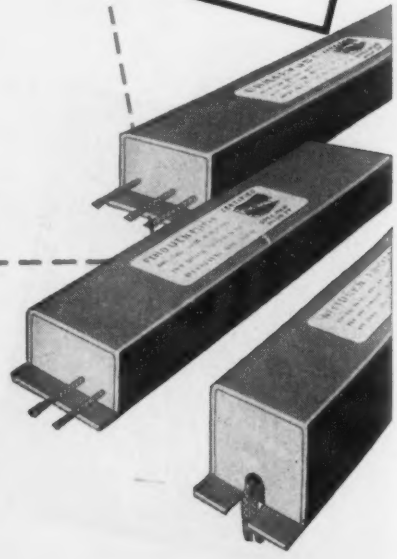
why Certified Ballasts *spell* Customer Benefits

FLUORESCENT fixtures equipped with Certified Ballasts can do a lot to build customer good will. Because they mean satisfactory performance *longer* . . . fewer service troubles . . . better lamp operation.

Here's why:

1. **Certified Ballasts are quality built . . .** made to specifications set up by foremost lighting engineers . . . to assure better lamp performance.
2. **Certified Ballasts are E.T.L. checked.** Sample ballasts are thoroughly tested by famous Electrical Testing Laboratories, Inc., before they are *certified* as meeting Ballasts specifications. Random samples are periodically rechecked at the Laboratory and at the factories.
3. **Certified Ballasts help assure top performance** in fluorescent lighting units that use them. Leading fluorescent tube manufacturers recognize this—since with Certified Ballasts in a fixture, they will guarantee lamp performance.

Whether it's in a new fluorescent fixture or for replacement in existing equipment, the customer's interests . . . and yours . . . are best served by Certified Ballasts.



Certified Ballast Manufacturers

Makers of Certified Ballasts for Fluorescent Lighting Fixtures

CHICAGO TRANSFORMER CORP.
3501 Addison St., Chicago, Illinois

GENERAL ELECTRIC CO.
Specialty Transformer Section
1635 Broadway, Fort Wayne, Ind.

JEFFERSON ELECTRIC CO.
Bellwood, Illinois

SOLA ELECTRIC CO.
2525 Clybourn Ave., Chicago 14, Illinois

WHEELER INSULATED WIRE CO.
378 Washington Ave., Bridgeport, Conn.

FOR TRANSMISSION LINE DESIGN USE BTC STANDARD DROP FORGED CLAMPS

For the lower end of insulator strings

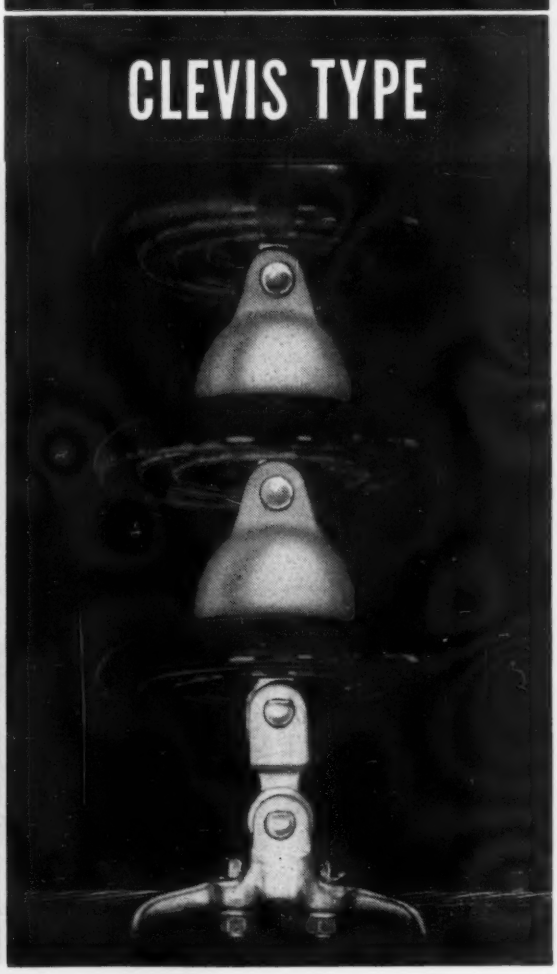
Use B.T.C. 6200 Series Clamps for all classes of service; they are suitable for all types of standard concentric stranded copper or aluminum conductors.

For use on hollow or expanded diameter copper conductors it is necessary to incorporate in the clamps features recommended by the cable manufacturers. At the Brewer-Titchener Corporation complete tooling is available for many popular sizes of hollow conductors.

Write for a copy of the B.T.C. Hi-Line Hardware catalog. It describes and illustrates our standard line of drop forged transmission line hardware.

Sold only through your insulator manufacturer

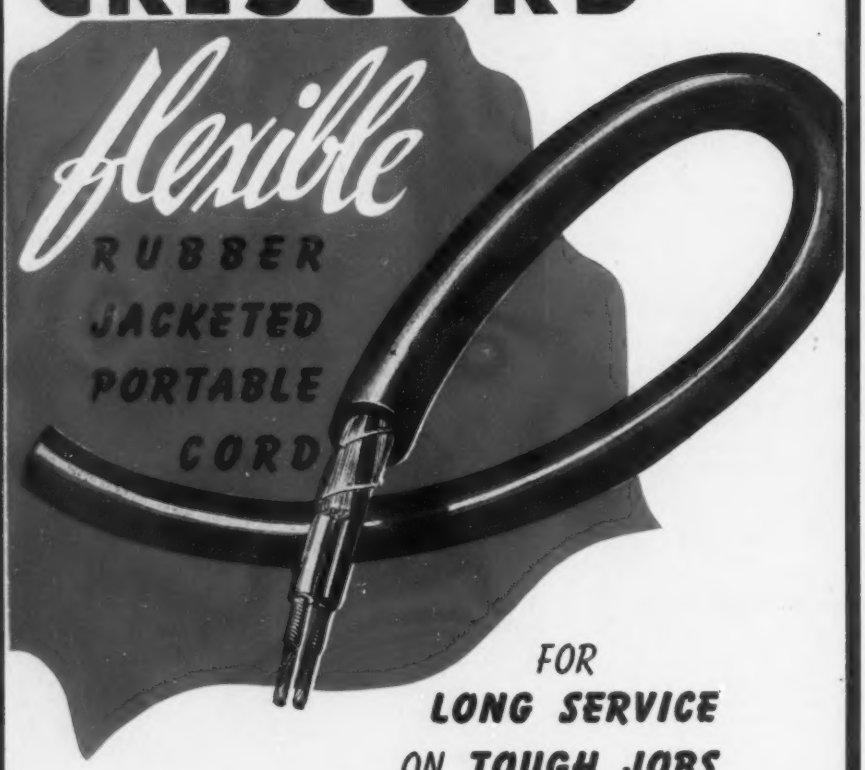
THE BREWER-TITCHENER CORPORATION
CORTLAND, N. Y.



CRESCORD

Flexible

RUBBER JACKETED PORTABLE CORD



FOR
LONG SERVICE
ON TOUGH JOBS

CRESCORD comprises two, three or four flexible copper conductors, with color-coded, heat-resisting, rubber insulation under a tough, synthetic rubber jacket. It is flexible, highly resistant to abrasion, crushing, cutting, water, weather and sunlight.

Type S. CRESCORD has a heavy jacket for maximum life on portable drills, tools and industrial equipment.

Type SJ CRESCORD has a lighter jacket for use on household and office appliances. It is made in sizes No. 18 and No. 16 AWG only.

Type SV CRESCORD is a small, light, extremely flexible cord for use on household vacuum cleaners. It is made in Size No. 18 AWG only.

CRESCENT WIRE & CABLE

NEMA

CRESCENT INSULATED WIRE & CABLE CO.

TRENTON, N. J.

BOOKS

you may want

URANIUM AND ATOMIC POWER, by Jack DeMent and H. C. Dake, 343 pages, Chemical Publishing Co., Brooklyn, N. Y., $4.

In one sense, the title of this book is misleading, since the emphasis is on uranium rather than atomic power. This is only natural, since the present edition is a reprint, with eight additional pages, of the work of the same title published in 1941. The principal chapters deal with a summary of work up to the beginning of the war on uranium fission and structure of the atom, a catalogue of uranium minerals, physical properties and chemistry of uranium and methods of analysis. The book contains useful data on uranium, but to state on the jacket and in advertising matter that the book contains for both the layman and the chemist "all the underlying principles and theories essential to a thorough understanding of atomic power and the atomic bomb," is certainly to maximize the minimum.—J. C.

☆

TRANSMISSION LINES—DESIGN, CONSTRUCTION AND PERFORMANCE, by Fred C. DeWeese, 297 pages, McGraw-Hill Book Co., $3.50.

Veteran operating and designing engineers will appreciate the new methods set forth herein and find the book a convenient reference for design and operation problems, while the younger engineer may obtain an over-all picture extending all the way from office calculations to field construction. The author presents some shortcut methods not previously published, one a method of calculating sag in long spans by the "mean length" method.

☆

RELAY ENGINEERING—A REFERENCE BOOK, handbook, prepared by Charles A. Packard, chief engineer of Struthers-Dunn Inc. and published by that company, 640 pages, $3.

Despite its pocket size, it contains a wealth of material not previously assembled in quite this sort of booklet. Announcing itself as a book to guide engineers and others in the selection and use of electromagnetic relays, it also covers basic concepts and includes a section on servicing and inspecting.

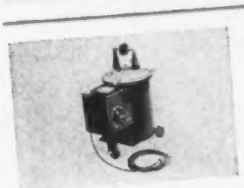
☆

JOINT POLE PRACTICES FOR SUPPLY AND COMMUNICATIONS CIRCUITS, a report of the joint committee on plant coordination of the Edison Electric Institute and the Bell Telephone System, 44 pages 50c to EEI members and their employees, $1.25 to non-members in USA, $1.35 in foreign countries.—Practices reported are based on Part Two, Fifth Edition of the National Electrical Safety Code.

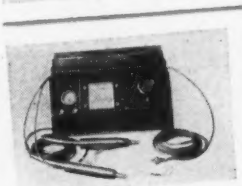
☆

ASTM Standards on Electrical Insulating Materials—Specifications, Methods of Testing, prepared by Committee D-9 on Electrical Insulating Materials, 560 pages, 6x9. Latest edition is now available under date October 1945 at $3.25 per copy from ASTM headquarters, 260 South Broad St., Philadelphia 2, Pa.

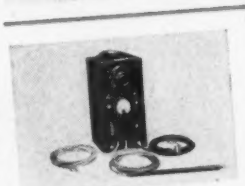
1. 0–35,000-volt oil tester, 0.5 kva, for 115- or 230-volt, 60-cycle circuits; 30,000-volt sets for 25-cycle circuits also available



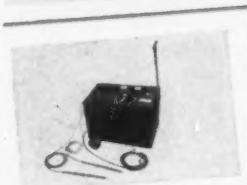
2. 0–35,000-volt oil and insulation tester, 2 kva, for 115- or 230-volt, 60-cycle circuits. Also available for operation on 25 cycles



3. 500–3000-volt insulation tester, 0.25 kva, for use on 115- and 230-volt, 50- and 60-cycle circuits



4. 0–2500-volt, high-capacity, insulation tester, 0.75 kva. Will stand 1-minute loads of 1.5 kva without injury. For 115-volt, 60-cycle circuits.



5. 2000- and 6000-volt general-purpose test set, 2 kva (intermittent), for 115-volt, 50- and 60-cycle circuits.

6. 15,000-volt general-purpose test set, 5 kva (intermittent), for 115- and 230-volt, 60-cycle circuits

7. 30,000-volt general-purpose test set, 25 kva (intermittent), for 460-volt, 60-cycle circuits

8. 50,000-, 75,000-, and 100,000-volt general-purpose testers, 5 kva (intermittent), for 115- and 230-volt, 60-cycle circuits. Also 7.5 and 10 kva (intermittent) for 230 volts, 60 cycles

9. 150,000-volt general-purpose tester, 25 kva (intermittent) for 230 volts, 60 cycles

These HIGH-VOLTAGE TEST SETS combine

Test Bench PRECISION WITH Tool Box PORTABILITY

These G-E portable testing sets are designed to make accurate, high-potential testing as easy and safe as possible. They are available in a range of test voltages and kva capacities to provide for practically *any* normal testing requirement in central stations, manufacturing plants, service shops, and laboratories.

They are great timesavers. You can pull them right up alongside jobs that cannot be moved to the test bench. You'll find them naturals for routine equipment testing, for simplifying maintenance checkups, for running high-voltage tests on appliance wiring, transformers, motors, insulators, linemen's equipment, cable circuits, sheet insulation, and insulating liquids.

***NEW!* This 24-page catalog**

contains descriptive data on these and other G-E portable a-c test sets. It enables the user of this type of equipment to compare the features of the various standard sets and to select equipment best suited for his needs. Write today for Bulletin GEA-4477. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

PORTABLE A-C HIGH-POTENTIAL TEST SETS

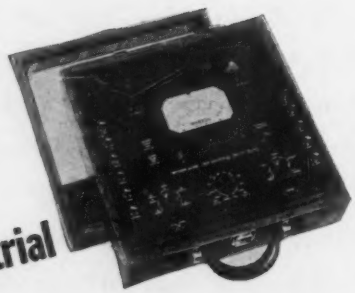
GENERAL ELECTRIC

401-33-5155

to Streamline ELECTRICAL TEST PROCEDURE

★ **the simplified AC CLAMP AMMETER**
(Model 633)

◆ provides the simplest, quickest means for determining circuit conditions, loads taken by motors and other electrical equipment — all during normal operation without circuit interruption. The clamping jaws are simply placed over the conductor or bus, and current reading taken.



★ **the complete industrial CIRCUIT TESTER**
(Model 785)

◆ 27 meters in one — with selected AC and DC voltage, current, and resistance ranges. With DC voltage sensitivity of 20,000 ohms per volt, it is ideal for testing photo-cell and sensitive relay circuits, alarm systems, electronic equipment etc., as well as small motors and controls, lighting circuits, etc. Can be used with current transformers and voltage multipliers.

★ **the versatile SIGHT METER**
(Model 703)

◆ direct-reading, pocket size meter calibrated to measure light values in foot-candles, and in "seeing tasks". Equipped with the WESTON VISCOR filter, it measures all light values direct, without correction factors. Models for other requirements.

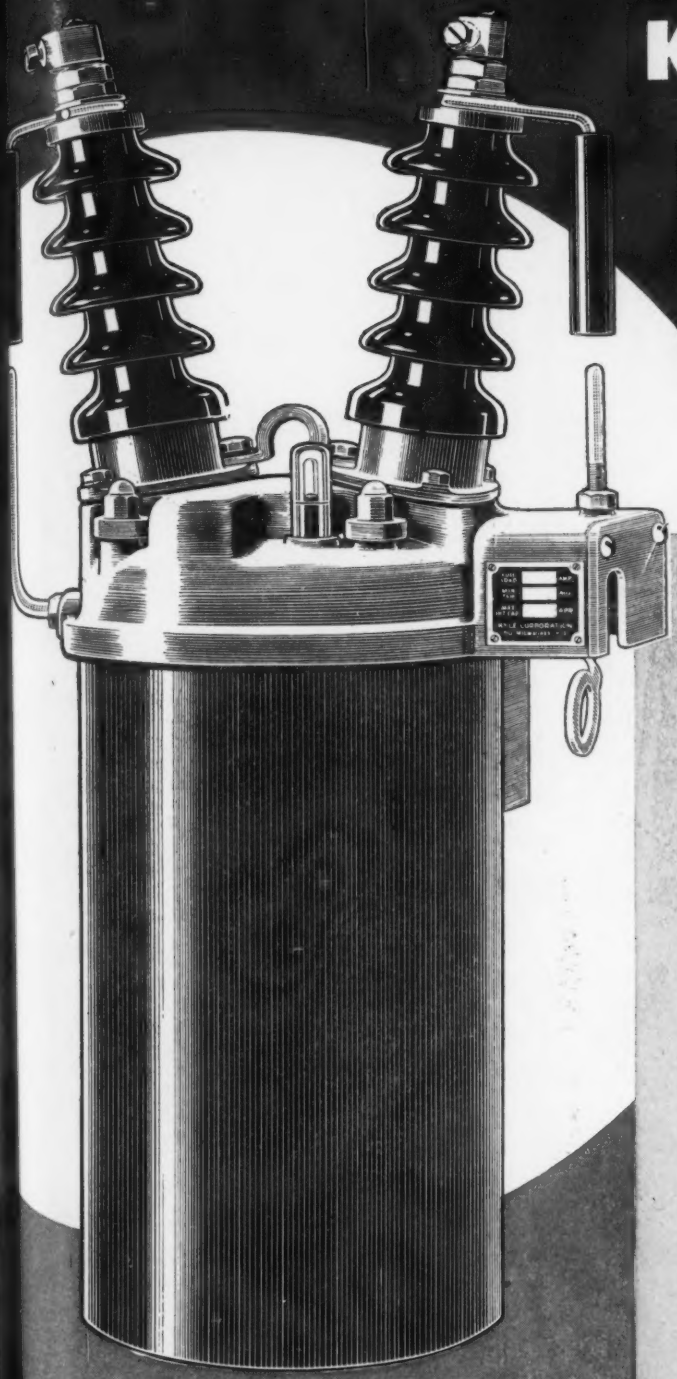
For complete information on these, and other time-saving WESTON instruments write . . . Weston Electrical instrument Corporation, 577 Frelinghuysen Avenue, Newark 5, New Jersey.

Weston *Instruments*

Albany · Atlanta · Boston · Buffalo · Chicago · Cincinnati · Cleveland · Dallas · Denver · Detroit · Jacksonville · Knoxville · Los Angeles · Meriden · Minneapolis · Newark · New Orleans · New York · Philadelphia · Phoenix · Pittsburgh · Rochester · San Francisco · Seattle · St. Louis · Syracuse • In Canada, Northern Electric Co., Ltd., Powerlite Devices, Ltd.

KYLE OIL CIRCUIT RECLOSERS WILL INCREASE YOUR REVENUE

by

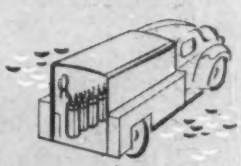


Keeping More of Your Lines in Service

Greater continuity of service on extended rural lines is possible with Kyle Type "H" Oil Circuit Reclosers than is provided by any other economical form of protection. Their use provides instant and automatic clearance of all temporary faults . . . with no interruption in service. Permanent faults are isolated to short branch lines by virtue of the fact that Kyle Reclosers may be coordinated with sectionalizing fuses.

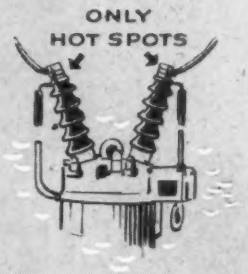
Reducing Maintenance Costs

This automatic elimination of common line faults reduces the number of service trips required. Isolation of branch lines on permanent faults makes for quicker, easier location of line difficulties. Dependable Kyle hydraulic operation . . . without clockwork or motors . . . requires service only at rare intervals. Small, compact, flat-based Kyle Recloser tanks are easily carried in service trucks.



Providing Safe, Trouble-Free Operation

Kyle Reclosers are easy to handle and safe to install and service. Only live parts are the upper terminals on the bushings, providing easy, safe access to the operating handle. This operating handle is trip-free. The Recloser may be manually closed without any danger to the operator. Vibration or jar cannot cause the Recloser to "fall closed" accidentally.



Let your Line Material Representative show you why Kyle Oil Circuit Reclosers are the economical answer to your line protection needs.

Ratings of Kyle Type "H" Oil Circuit Reclosers

Voltage	2400 to 15,000
Ampere Rating	5, 10, 15, 25 or 50
Minimum Tripping Current	10, 20, 30, 50, 100 Amperes
Interrupting Capacity	150, 250, 375, 600, 1200 Amperes

MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

KYLE Circuit Reclosers are Designed and Manufactured for LINE MATERIAL COMPANY MILWAUKEE WISCONSIN

We Appreciate Your Patience, T-K Dealers!

● All during the turbulent war years, we did our level best to keep on shipping as many T-K replacement electric range units as we possibly could—and *succeeded* better than many others!

Now, despite our best efforts—and certainly despite our eagerness to meet the heavy demands for T-K laboratory-tested units—we are able to ship only a modest percentage of orders flagged "Immediate Shipment." We want you to know we will continue to ship units as fast as we can build them, consistent with our rigid quality standards.

We appreciate your patience, and look forward to the day when we can ship all orders promptly on schedule. Meanwhile, we hope you will order only such quantities as you absolutely need for current requirements.

TUTTLE & KIFT, INC.

1825 NORTH MONITOR AVENUE • CHICAGO 39, ILLINOIS

MANUFACTURERS OF DOMESTIC AND INDUSTRIAL
HEATING UNITS • SWITCHES • CONTROLS

PRODUCTS

that are news

Commercial Luminaire (300)

Mitchell has a shielded two- and four-light commercial luminaire equipped with double-strength prismatic ribbed glass panels. This unit may be surface or suspension mounted, singly or in continuous rows; is wired ready for hanging; has standard approved Tulamp ballast, sockets and starters; is stroboscopic corrected. Power factor is said to be more than 90%. These luminaires are for 110-125 volts, 60 cycles, a-c, with higher voltages available. Model 3003 is for two 40-watt lamps; 48 in. long, 5⅞ in. high, 12 in. wide. Model 3004 is for four 40-watt lamps; 48 in. long; 6½ in. high, 17½ in. wide.

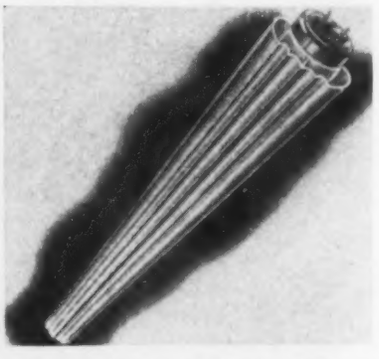
Recessed F Fixture (301)

All-Bright Electric Products Co. has designed a two-, three- and four-light recessed fluorescent fixture, featuring a telescopic frame which fits flush to the ceiling. Available either in eggcrate or honeycomb styles, this fixture is for individual or continuous rows. All models are 48 in. long, 11¾ in. wide. Model REC-240 is for two 40-watt lamps; model REC-340 is for three 40-watt lamps; model REC-440, for four 40-watt lamps.

Refrigerator Lamp (302)

General Electric has designed a 40-watt lamp for mechanical refrigerators. Smaller than the G-E 40-watt general service lamp, this new type is said to give approximately the same light. It is inside frosted, has a medium screw base, is designed for 120 volts, with a rated life of 1,000 hours under specified test conditions. List price is 11c, plus tax.

Plastic Diffuser (303)



A 4-ft. white plastic diffuser which snaps on a 40-watt fluorescent lamp is offered by Edwin F. Guth Co. Called the PFC-100, the device has a spring like patented design and grips the lamp along its entire length. It is said to reduce lamp brightness 30%, to have 82% T.F.

Plug-In Pilot Light (304)

A plug-in pilot light for standard electric outlets or sockets has been announced by Industrial Devices Inc. It is intended primarily for 110-volt a-c or d-c operation.

You sent us Househunting!
RAILLEY MOVES TO NEW LARGE PLANT
MAKERS OF PIN-IT-UP LAMPS BOOST CAPACITY WITH 160,000 SQUARE FEET OF FACTORY SPACE

YOUR deluge of orders for Pin-It-Up * and other Railley Lamps have so strained our capacity that we had to seek larger quarters. Our spacious five-story building not only affords a more efficient production area . . . but better facilities for our design and research departments which are at work on more beautiful Railley products that you will be seeing soon.

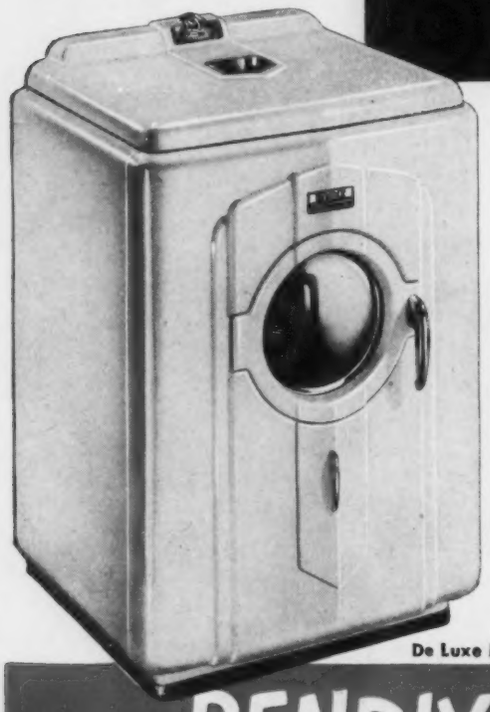
Railley
CORPORATION · CLEVELAND, OHIO
ORIGINATORS OF THE PIN-IT-UP LAMP

NEW ADDRESS: 12910 Taft Ave., Cleveland 8, Ohio

Two-Way Research Keeps BENDIX *Ahead!*

Above: K. C. Randolph, chief chemist, determining the effects of certain soaps, and processes on types of fabric. A. E. Murphy, laboratory assistant, reading a total dissolved solids meter, to check soap left in clothes.

Right: View of testing bench. Left to right, A. E. Murphy, operating a Hunter Reflectometer. K. C. Randolph, inserting measured detergent into one of test machines. R. E. Oeler, project engineer, weighing test wash load.



De Luxe Model

Here at Bendix Home Appliances, Inc., in South Bend, intensive research is conducted from *both* the manufacturer's and the home owner's viewpoints.

From the Engineers' Viewpoint—Bendix automatic "washers" are operated and tested through every conceivable condition under which they will be expected to perform.

From the Housewives' Viewpoint—The Bendix Home Laundry Institute staff observes and checks results from machines operated under typical home conditions, with various kinds of fabrics and clothes soiled in use—and while using different soaps, detergents, softeners and other cleansing agents.

Both such research activities are directly resultful in improving the qualities of design and manufacture, and raising the efficiency of Bendix performance in the home.

BENDIX automatic Home Laundry

BENDIX HOME APPLIANCES, INC., SOUTH BEND, INDIANA · PIONEERS AND PERFECTORS OF THE AUTOMATIC "WASHER"

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

March

1946

©

That "Postwar House" which Fritz Burns, spectacular Los Angeles builder, unveiled Mar. 1, drew thousands for a look-see. They saw a Westinghouse laundry built in, but cooking and refrigeration were gas because the gas people were willing to custom-build the range and refrigerator to fit the work surface lines. The refrigerator is under the work surface; may have the same objections to it that many women have to a low range oven. Watch for a full story on this house next issue.

Postwar House

Kaiser's jet propulsion dishwasher, operating on water pressure both to clean dishes and spin them, was given its first public showing there too. Burns and Kaiser are working together on housing plans.

Jet washer

No spring fair will be held, as had been hoped, by the San Diego Bureau of Radio and Electrical Appliances. Reason--not enough merchandise and no surety of deliveries. Maybe there will be enough for a summer show at Del Mar, where Bing Crosby's ponies run.

No fair

Allis-Chalmers seems to be first out with an electronic heater unit which can either be used to cook a full meal in five minutes or be used for industrial processes. It's a 2-kw. high-frequency oven, operating at 27 million cycles.

Quick meal

Noma, once known only for its Christmas tree sets, has really branched out. Bought Estate Stove Co. and Refrigeration Corp. of America, makers of Frigid-Freeze home freezers and air conditioning units, and even a doll manufacturer. Expects to make a full line of appliances.

More than lights

Newest controls on construction will make illegal and almost impossible to get materials for store improvements and remodeling. New buildings especially will be hit. It's all to go for veterans' homes, which the program plans to make prefab and minimum, as far as wiring adequacy is concerned.

No more remodeling

Warning--Look out for mail order deals offering you appliances. San Diego Better Business Bureau tells of a slick pair who got an 8,000 name dealer mailing list, offered toasters and irons for immediate delivery, took one third cash and skipped. Cleaned eager dealers of $12,000. Postal inspectors held mail with $25,000 more. Better to know from whom you buy.

Beware

Blackstone, one of the two prewar makers of automatic washers, will soon have samples of its new automatic, said the C. G. Hamilton Co., distributor. Only one of the conventional model washers was on display during Market Week. With it was a sample of the Magicaire vacuum cleaner, a tank type cleaner.

Not yet

Conlon was shown at San Francisco by its California distributors, Maryon & Williams. Ironers are now being delivered, washers will be in March, for samples. Conlon, recently acquiring the Moore Corp. and Eagle Electric Mfg. Co., will soon be in the field with a full line of home appliances.

Ironers now

Maryon & Williams, also handling Marbro floor lamps, said deliveries were being made within 30 days of orders. Featherline irons are going to department stores first for introduction, backed by heavy national advertising, then will go to all dealers. Copeland refrigerators, say Maryon, will be available by midyear.

Lamps 30 days

Nesco, dependent upon steel for its full line of pots, pans, kitchenware and roasters, thought that fall would see some merchandise, and it was not taking orders at the Mart. Its distribution of roasters is separate from the pots and pans. Electrical representatives, such as Russell & Co., San Francisco, and jobbers will handle the line.

Steel?

Frigidaire has set up its distribution through a new subsidiary, Frigidaire Sales Corp., which will operate sales branches but will not disturb distributorships such as W. H. Bintz, of Salt Lake City; Jensen-Byrd, of Spokane; Sunset Electric, of Portland and Seattle; or Northwestern Auto Supply, of Billings. The Oakland and Los Angeles factory branches come under the new plan. National prices and other simplifications are possible under the plan, said R. G. Hutchison, who heads Western sales.

New setup

Sears Roebuck is cataloging a low priced home freezer, the Seegar-Sunbeam, to sell mail-order at $167, $194 and $232 for the 6, 9 and 12 ft. models. Retail store prices will be slightly higher.

Mail order

Servel is still trying to persuade the aggressive gas companies in southern California to stay in direct merchandising, for they accounted for a big chunk of prewar sales.

Gas pressure

IT HAS THE *Aluminum Sole Plate* WITH CAST-IN ELEMENT

"**That's why this full-sized iron feels so light.** Ironing is easier . . . I don't get so tired!

"**Then, too, aluminum conducts heat fast . . .** all women know that. And with the heating element cast right into the aluminum sole plate the iron holds a steady heat . . . even on cold, damp garments. I get my ironing done lots faster!

"**The choose-your-heat dial** has extra adjustment for the low heat range of the new synthetic fabrics as well as the regular range of rayon-to-linen. *My Arvin is safe on ANY fabric!*

"**Of course, there are many other Arvin features I like . . . but it's the *aluminum sole plate with cast-in element* that really takes the 'drag' out of my ironing day! Tell other women about it—THEY'LL BUY!**"

ARVIN *is the name on many fine products of* **NOBLITT-SPARKS INDUSTRIES INC.,** *Columbus, Indiana*

Electric Irons • Electric Heaters and Appliances • Metal-Chrome Dinette Sets • Outdoor Metal Furniture • Laundry Tubs • Ironing Tables

"You fascinate me, Sir"

—SHE SAID

"TELL ME MORE ABOUT THE IRON THAT LIFTS ITSELF."

"Try and Stop me"—says I. "Lady—just think. No lifting. No tilting. No twisting. No more extra work for those little wrists—you'll just flick the little red button—and presto! —the Proctor Never-Lift lifts itself. Comes to rest on its own legs till you want to use it again. Then—just press the handle—and back pop the legs, neatly out of the way.

"Pardon the pun," I continued—"but according to laboratory tests the Never-Lift is *number one on the Heat Parade.* It's got just about perfect heat distribution. Never breaks out in spots. No COLD SPOTS to slow you down with drag and wrinkling. No HOT SPOTS to cause scorching. Irons smoother, faster, more efficiently.

"Take your time—when you iron with a Never-Lift. The Speed Selector Fabric Dial adjusts the iron temperature for your *personal* ironing speed as well as for the fabric. You can iron fast or slow . . . still get the proper heat. It's a Proctor First.

"Proctor really knows its onions—when it comes to irons. Proctor's been a leading contributor in the development of the modern electric iron . . . a pioneer in heat engineering for sixty years. (Every Proctor appliance features the Proctor specialty—precision thermostatic heat control.) That's why my advice is—wait for a Never-Lift. It can't be beat for labor-saving features and superior craftsmanship. We'll have 'em soon. The big Proctor magazine ads will tell you when."

"DON'T WORRY, I'M WAITING . . . AND THANK YOU SIR"—SHE SAID

PROCTOR NEWSMAKER IN APPLIANCE MERCHANDISING

PROCTOR ELECTRIC COMPANY, PHILADELPHIA 40, PENNSYLVANIA

Cabinet Line (305)

Hotpoint is making a metal cabinet line to complete its all-electric kitchen assembly. Storage cabinet models come in seven widths for wall installation and six widths for base units with working surfaces. One utility cabinet contains 28 cu. ft. of storage space, so constructed as to hold cleaning utensils and supplies. Cabinet sinks are made in 42-, 54- and 60-in. widths, each with a single porcelain bowl and porcelain top. Wall cabinets run in width from 15 to 36 in. and base cabinets from 15 to 42 in. Wall cabinets are 13 in. deep, 30 in. high, except for the 36 in. width, which is 18 in. high. Base cabinets and sink units are 24½ in. deep; cabinets without counter tops are 34½ in. high and sinks are 36 in. high. All are finished in white only, with bright trim.

Laundry (306)

The Model B-3 laundromat, which fills, washes, rinses, spins clothes, cleans and drains and shuts off automatically, has been announced by Westinghouse. This machine is white with black trim, is 36 in. high, 31 in. wide and holds 9 lb. of clothes, dry weight. A plastic temperature dial is adjustable for any water temperature from 60° to 160° and a plastic time dial is adjustable for any washing period. A thermostat automatically protects against overload. Motor is ¼ hp., 115 volts, a-c and operates a two-speed transmission drive. Motor and transmission drive are lubricated for life.

Home Ironer (307)

Bendix has announced dimensions of its automatic home ironer, scheduled for the market next summer. In the closed position, the unit is 18¼ in. wide, 36½ in. high and 34½ in. long. Opened, with its top pushed back to form a shelf 34½ in. long and 12¼ in. wide, the ironer is 44½ in. wide, 42½ in. high, 64½ in. long. A wing shelf at either end extends 15 in. and is 15 in. wide. Door shelves, located in front of the machine at either side of the operator, are 12 in. long and 10¼ in. wide.

Time-Switch Clock (308)

General Electric has developed a time-switch clock, called the Select-O-Switch, to control radio and other electrical appliances. The operation is controlled by 48 keys, which permit selection up to as much as ten hours in advance. The user plugs the clock into a convenience outlet, then plugs the appliance to be controlled into the outlet in the back of the clock. The clock is self-starting, has a sealed-in-oil mechanism, operates on 60-cycle, 110-125-volt a-c.

Record Changer (309)

Garrard Sales Corp. has introduced a new model, RC 60, in its line of automatic record changers. This new model has automatic stop, speed control, patented record spindle and selector mechanism to handle mixed 10- and 12-in. records in any combination. It comes with a choice of a magnetic pickup for interchangeable needles or a one-ounce crystal cartridge.

Bottle Warmer (310)

Electrical Industries is making a warmer and vaporizer for baby bottles. Heating unit has automatic shut-off and is designed for a-c. A permanently attached cord is included.

THE BEST GIFT YOU COULD RECEIVE ON MONARCH'S 50th ANNIVERSARY

3 GENERATIONS OF COOKING PROGRESS
Monarch RANGES
SPEED-ECONOMY
TWIN EFFICIENCY
AUTHORIZED DEALER For MONARCH RANGES and HEATERS

ELECTRIC

GAS

COAL-ELECTRIC

COAL-GAS

COAL-WOOD

CIRCULATOR

Yes, to become an authorized Monarch dealer is really cause for celebrating . . . . for Monarch's Golden Jubilee Line gives you outstanding range models for every type of prospect . . . . electric, gas, coal-wood and combination ranges.

Throughout the line, exclusive Monarch features stand out to aid in competitive selling . . . . "beauty" . . . . "cooking efficiency" . . . . "durability" . . . . "exclusive designs." And a national advertising campaign in leading farm publications and magazines to help you sell your customers.

So . . . . to cash-in on the accumulated dividends of Monarch's fifty years of cooking progress, write for details to place this authorized Monarch dealer sign in your window at once.

MALLEABLE IRON RANGE CO.
3936 Lake Street Beaver Dam, Wisconsin

RANGES AND HEATERS
Monarch-Paramount
COAL-WOOD, ELECTRIC, GAS and COMBINATION RANGES

Surplus Material & Equipment
For Sale by
CALIFORNIA SHIPBUILDING CORPORATION

WELDING ELECTRODES

★ Large quantities of many manufacturers' types and sizes, ranging from 3/32 up to 5/16. This stock includes Lincoln Electric Co. Fleetweld rod, A. O. Smith Co. Smithway rod, National Cylinder & Gas Co. Sureweld rod, Lindy Air Products Co. 5/32, 3/16 and 1/4 Unionmelt rod, Wilson Co. #98 rod, and General Electric #W-22 and #W-27 rod.

PANEL BOARDS AND SWITCHES

★ Lighting panels—four, six, eight, ten and twelve circuit, 10 to 30 AMP breakers, underwriter approved.

Switches—200 and 400 AMP., 575 volts.

Miscellaneous switch boxes, branch boxes, conduits, and explosion-proof fixtures.

ELECTRIC CABLE

★ 295,000 feet of 1, 2, 3, and 4 conductor cable, ranging from 16 to 300 MCM. Rubber covered lead and armored, varnished cambric, heat and flame resistant armored, synthetic resin and armored, oil resistant portable, and varnished cambric lead and armored.

ELECTRIC FIXTURES

★ Ships' deck fixtures—water-tight, explosion-proof, ranging from 60 to 200 watt, similar to commercial RLM type. Fixtures complete with globes and guards.

500 watt projector type floodlights and 1000 watt searchlights.

Many items of ships' equipment—Suitable for many industrial needs.

All types of ships' chandlery, ships' pumps and ships' turbines, durable tools, light and heavy hardware, anchors, assembly floats, and signal pistols are only part of the tremendous inventory of this great 14-way shipyard. All materials and equipment are available for immediate sale and priced for quick disposal. There is no red tape.

Your inquiry will receive prompt attention.

Write or Wire

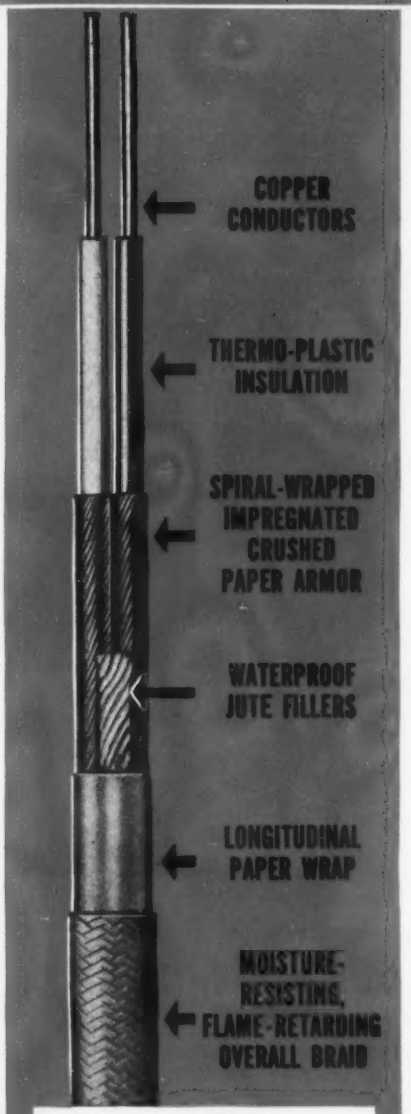
Industrial Equipment Company

Care of California Shipbuilding Corporation, P.O. Box 966, Wilmington, Calif.

Exclusive Sales Representatives for

CALIFORNIA SHIPBUILDING CORPORATION

A NEW CABLE FOR HOMES AND FARMS



COMPARISON
CABLE DIMENSIONS
No. 14/2 PVX
Non-metallic Sheathed Cable

Type T Conductor—.131 inches
Overall Dimensions—.23 x .44 inches
Weight per M Feet—77 lb.

No. 14/2 Standard
Non-metallic Sheathed Cable

Braided rubber-covered conductor—.200 inches
Overall Dimensions—.37 x .63 inches
Weight per M Feet—104 lb.

PVX

REGISTERED TRADE MARK

NON-METALLIC SHEATHED CABLE

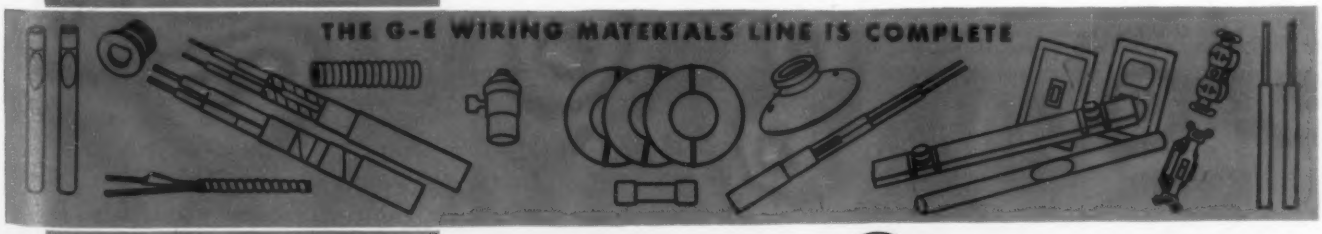
with Thermo-plastic Insulated Conductors

ADVANTAGES

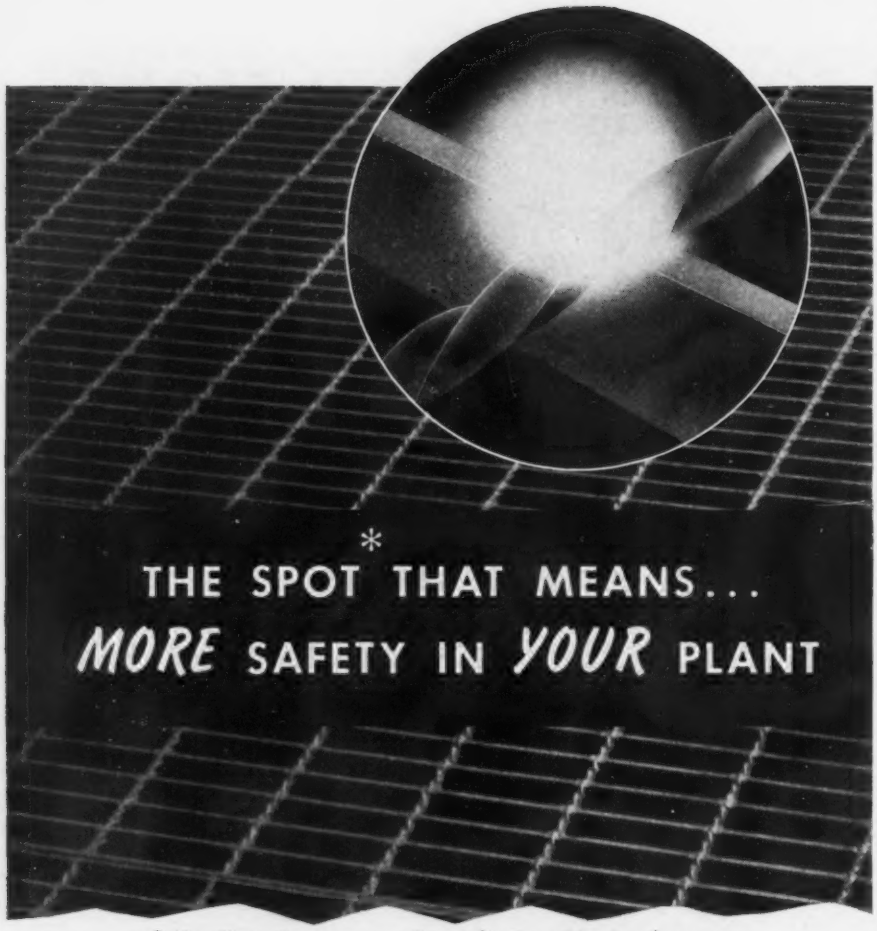
1. Small overall diameter—easy to handle. Requires smaller holes
2. Lighter weight—Facilitates handling during installation
3. Type T conductors—Insulated with long-life, thermo-plastic compound
4. Small diameter of conductors—Requires less space in outlet boxes
5. Positive conductor identification—Insulation has permanent color
6. Conductor insulation—Resistant to oils, acids and alkalies
7. Insulation and braid—Both are flame- and moisture-resistant
8. Improved braid finish—Smooth, non-tacking and non-marking
9. Free-stripping—Braid, paper armor and insulation all free-stripping
10. High rating—Approved for 60 degree C operation

Use this new Underwriters' approved cable for wiring homes, farm buildings and other small buildings. You'll find PVX easy to install. It has small diameter and is light weight. It can be depended upon to give long service. PVX has Type T conductors insulated with thermo-plastic compound. This insulation is resistant to oils, acids and alkalies. Improved crushed paper armor protects the conductors and overall is a flame- and moisture-resistant braid. PVX is available in sizes 14 to 4 without ground wire.

FOR FURTHER INFORMATION see the nearest G-E Merchandise Distributor or write to Section W361-18, Appliance and Merchandise Dept., Bridgeport, Conn.



GENERAL ELECTRIC



* The illustration expresses the application of heat and pressure used to forge crossbars and bearing bars into one integral unit.

There's a big difference between ordinary grating and Blaw-Knox steel grating safety. For Blaw-Knox is the *only* grating with the electroforged *twisted bar.*

In factories, on cat-walks—see to it that skid-breeding floors are made skid-proof in any weather. Specify Blaw-Knox steel gratings, the only gratings with built-in twisted-bar safety factor.

...AND HERE ARE 5 REASONS WHY

1. **SELF-CLEANING, no sharp corners to clog.**
2. **MAXIMUM OPEN AREA for light and air.**
3. **EASY TO MAINTAIN... paint reaches entire surface.**
4. **STRONG electroforged construction for easy erection.**
5. **SAFE footing at all times with twisted cross bar.**

When further improvement in open-steel floors is called for by changes in business practice—Blaw-Knox will lead as always.

Blaw-Knox Catalog No. 1887 gives complete details on Blaw-Knox Electro-forged Steel Grating. Send for it.

DIVISION OF BLAW-KNOX COMPANY
2098 Farmers Bank Building, Pittsburgh 22, Pa.

Seven Blaw-Knox plants have been awarded the Army-Navy "E", and have regularly received renewal stars for continued high achievement in the production of war materiel.

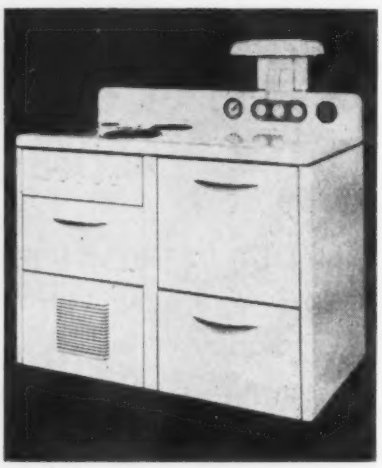
BLAW-KNOX GRATING

Airport Indicator (311)

An approach angle indicator for airport landing using a 100-watt incandescent bulb to project a tri-color beam over a one-mile range has been developed by Westinghouse. This indicator sends the light through seven lenses, breaking it up into green, red and amber beams, indicating correct angle, too low, too high. To avoid glare and confusion with other lights, the beams flash on for one second, off for one second. For larger airports, a 250-watt lamp is available, giving about three miles range at night.

Range, With Fan (312)

Thermador's new range model features a built-in heat fan which warms in winter, cools in summer, an 18-in. oven, and surface working space 44 in. wide. The model is equipped with a new type heating element, claimed to heat faster, hold warmth longer and to be easily removable for cleaning.



Range Timer (313)

Warren Telechron has a new range timer in production. This timer can be installed from the front of the range, using the bayonet type of installation. The manufacturer will leave an opening for the timer, with two slots at the top and bottom through which clamps are inserted. When the timer is twisted a fraction of a turn, it is locked automatically. This unit has a combination flashing light and buzzer signal. When the timer is set for the audible visual arrangement, the work light built into the range is electrically connected to the timer and gives the first signal by intermittently flashing on and off. If no attention is paid to the flashing light, a buzzer is sounded and continues to sound until the timer is turned off.

Range Line (314)

Westinghouse has announced range models from a two-oven to a small apartment size and including a combination fuel and electric model for areas where the range is used for room heat. These units will feature Tel-A-Glance switch knobs indicating only the heat setting being used; Corox surface units with five heat positions; single dial oven control; aluminum utensils for the deep-well cooker.

Top Arrangement Choice (315)

The new Presteline electric range has a choice of three top range cooking unit arrangements, a "pig-tail" built-in wiring connection, large oven, storage compartment, recessed top range controls.

"This Starter hasn't been opened since last summer!"

THE SECRET OF A-B MAINTENANCE–FREE CONTACTS

New

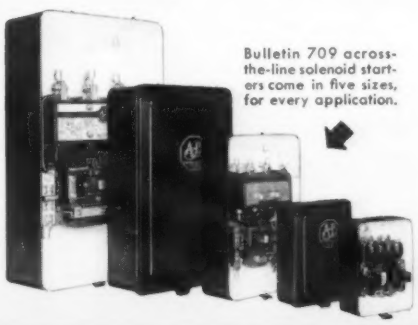
This is how the double break, silver alloy contacts on an Allen-Bradley solenoid starter look at the start of a test involving 50,000 operations. Note the generous size of these contacts.

After test

This unretouched photograph shows the same solenoid starter contacts after 50,000 operations. Contacts are black, but are in just as good condition as at the beginning of the test.

"No Attention—No Contact Maintenance . . . . yet it's operating perfectly"

Strange as it may seem to the maintenance men trained to file or dress the contacts on their motor starters, the silver alloy contacts on Allen-Bradley solenoid starters *never* require maintenance of any sort. Any oxides that may form on these contacts are good electrical conductors. That's why the contacts are good for millions of operations without attention.



Bulletin 709 across-the-line solenoid starters come in five sizes, for every application.

Allen-Bradley solenoid starters are easy to install, too. The white interior reflect light and illuminate the starter in dark corners. These starters have plenty of knockouts and allow generous wiring space. Write for full details.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

It's the Moving Parts that Give Trouble

1 Moving Part—1 Chance for Trouble

2 Moving Parts—2 Chances for Trouble

4 Moving Parts—4 Chances for Trouble

20 Moving Parts—20 Chances for Trouble

Only 1 Moving Part

in Allen-Bradley Solenoid Starters

It's the amazing simplicity of the Allen-Bradley solenoid starter that makes it so trouble-free. The only moving part is the simple plunger which carries the movable contacts. There are no pins, pivots, or bearings to corrode and stick . . . no flexible jumpers to break. And the double break, silver alloy contacts never need filing, cleaning, or dressing. With an Allen-Bradley solenoid starter you can get millions of trouble-free operations. Just install this starter . . . and forget it!

Allen-Bradley Company
1316 South Second Street, Milwaukee 4, Wis.

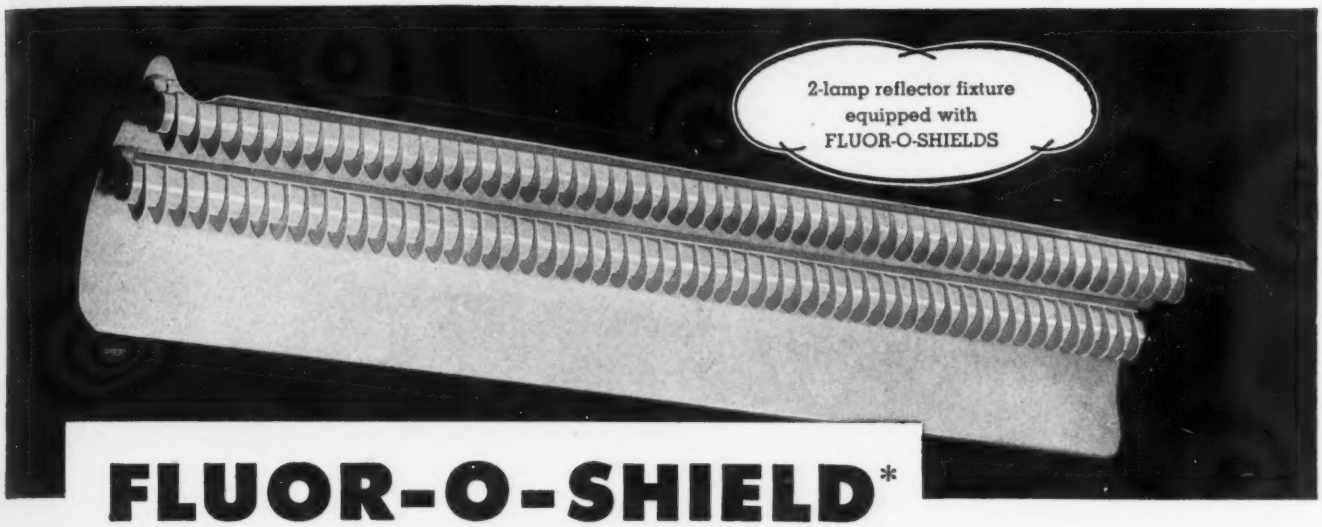
Right—Bulletin 709 across-the-line solenoid starter. Note its attractive appearance, white cabinet interior, and generous wiring space.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

PRINT IN BINDING



FLUOR-O-SHIELD*

light diffuser for fluorescent lamps

- **Eliminates Glare · Decorative · Instantly Attached**
- **Diffuses Light Evenly · Fits Open-Face Fluorescent Fixtures**
- **Ideal for Factory, Office, Store and Home Lighting**
- **Of Lightweight Aluminum, Durable, White Enameled**

FLUOR-O-SHIELD is adaptable wherever exposed fluorescent lamps (40 W and 20 W) are used. Snap-on clips permit instant attachment or removal without bolts, screws or tools. Simply snaps on. Reduces eye-strain, results in improved work and efficiency. Improves appearance of all open lamp fixtures. Will not cast shadows. Does not catch dust or dirt.

A TIP FOR DEALERS! Don't overlook a profitable business through the combined sales of FLUOR-O-SHIELDS, fluorescent lamps and starter replacements. FLUOR-O-SHIELD is an inexpensive, fast-selling, *multiple* item. Take stock of the opportunities right in your immediate vicinity—shops, offices, grocery stores, restaurants, factories. The decorative effects are surprising, too.

Available in two sizes: 40 watt, 20 watt. Order today! If your distributor does not have stocks, ask him to write us.

CAMFIELD MANUFACTURING COMPANY · GRAND HAVEN, MICH.

Nothing like it for quick sales!

$1.95

40 Watt—48-inch

$1.25

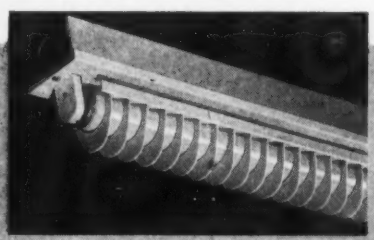
20 Watt—24-inch

SPECIFICATIONS:

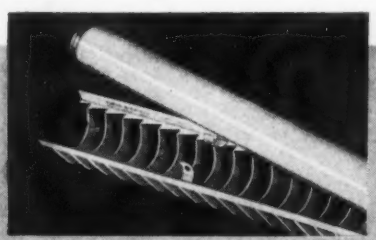
Catalog No.	Length	Fits Tube	Units per Pkg.	Color
27-1-40	48-in.	40 watt	12	White
27-5-40	24-in.	20 watt	12	White

*Trade Mark—Patent Pending

No glare from any angle. FLUOR-O-SHIELD casts no shadows.

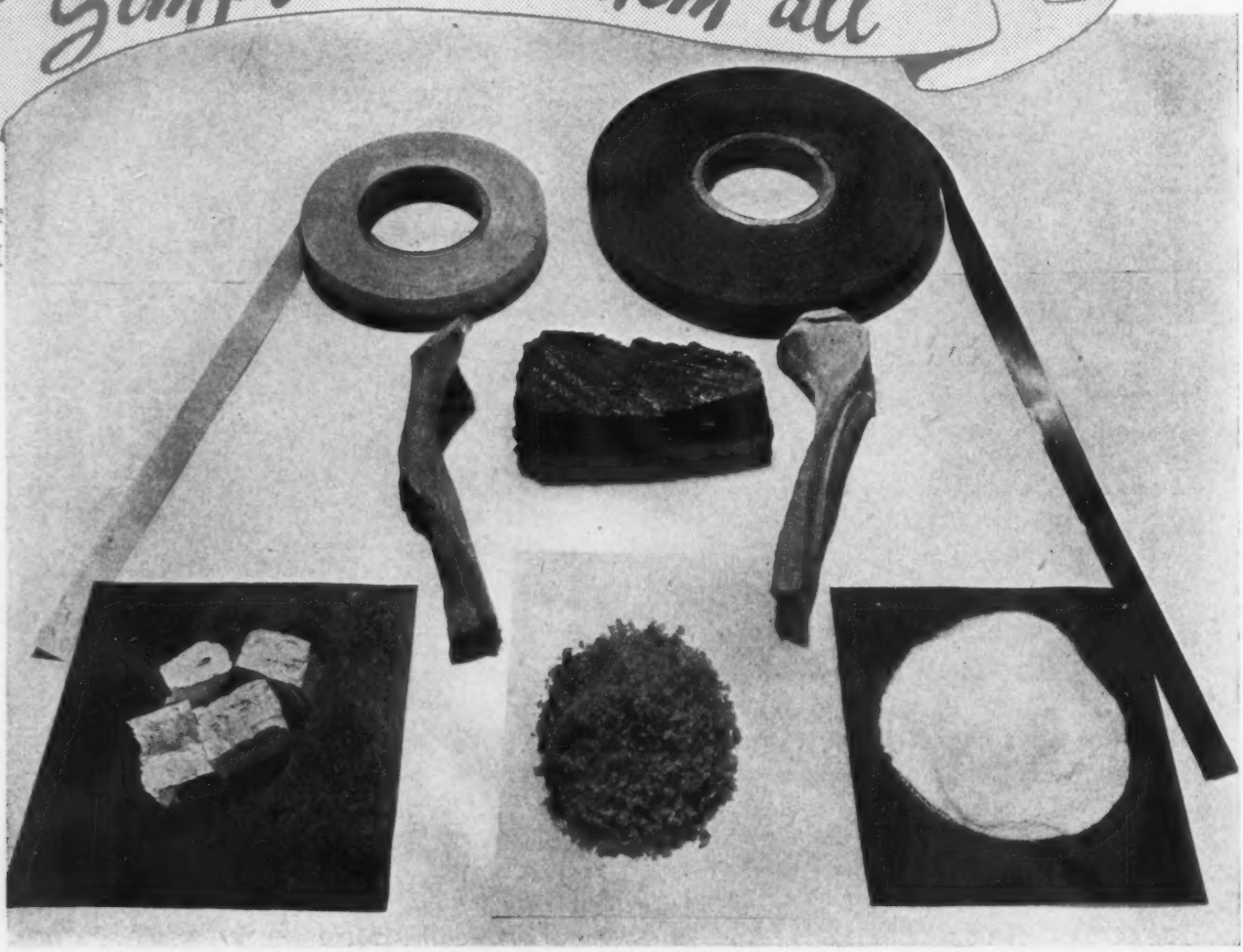


Snap-on clips for instant attachment or removal.



No time lost for installation. Just snaps on. Shipped ready for immediate attachment.

Simplex uses them all



Whether it's the good old stand-by insulations, like varnished cambric or paper, or the very newest, such as polyethylene or silicone rubber, Simplex uses all of them in the places for which they are best adapted. Because Simplex has had wide experience with most of these insulations, it is thoroughly qualified to advise you on the engineering problems peculiar to cable construction and cable uses.

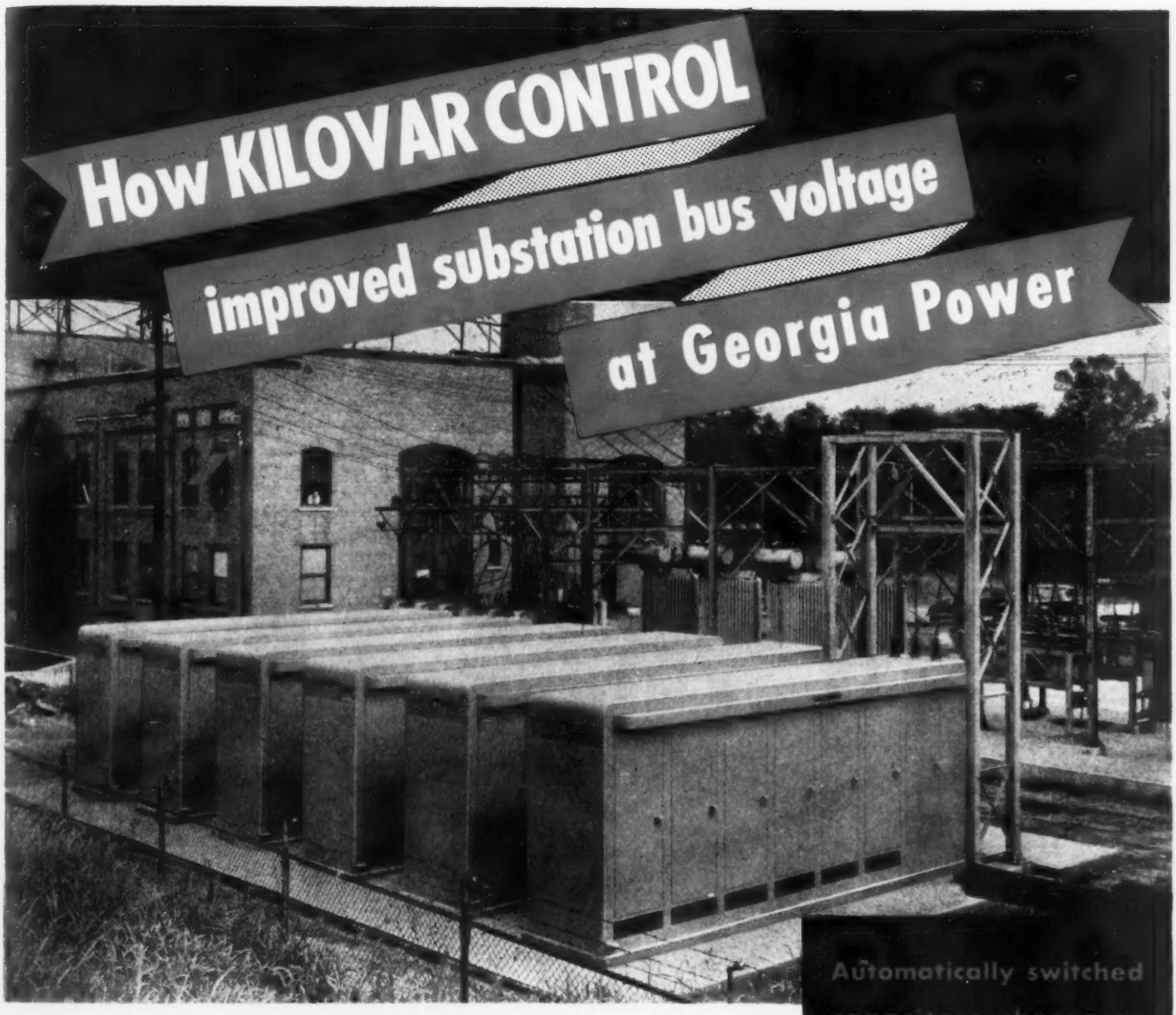
When you need a cable that has to meet extraordinary conditions, you can depend upon Simplex research and engineering to provide the best cable for you that the state of the art will permit. There is no leaning toward one material or the other. All insulations have some uses. Only a qualified cable engineer backed by years of experience can tell you whether one or the other kind of insulation is best for the job you propose to do.

Remember, the best things in cable materials and constructions come from Simplex first.

Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.


How KILOVAR CONTROL
improved substation bus voltage
at Georgia Power
Automatically switched capacitors chosen as most flexible and economical method

THE Georgia Power Company found it desirable to control the bus voltage at its 110,000- to 13,800-volt Augusta substation to prevent widely varying voltage levels between periods of full load and light load. Six of our attractively styled Pyranol capacitor equipments were chosen for the job. Each equipment is rated 2520 kva.

The stepdown transformers at the substation were set on the proper high-voltage tap to give the desired low-voltage bus voltage at light loads. As the voltage drops with increasing loads, the 15,120-kva capacitor bank is automatically connected to the circuit in six equal steps, supplying kilovars to the system and keeping the bus voltage up.

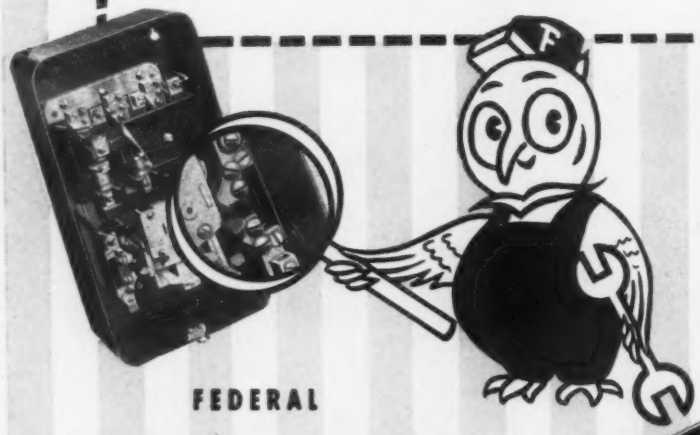
As expanding loads increase the minimum demand at Augusta, there will be less difference in voltage between light load and full load. The transformer tap setting can be changed, and some of the six capacitor equipments can be easily moved to other points of the system that in the future may need reinforcement.

Thus, by selecting capacitors for this installation, Georgia Power not only improved present operating conditions but also provided a flexible source of kilovars for future needs.

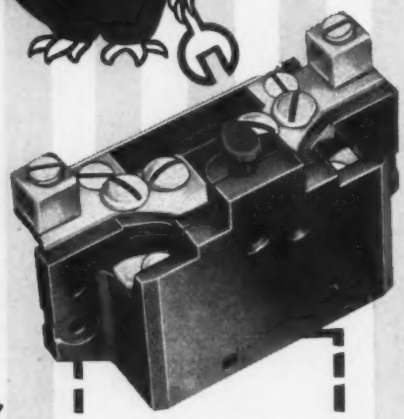
We will be glad to help you analyze your kilovar requirements and estimate the benefits of Pyranol capacitor banks on *your* system. Ask for Publication GEA-4225. ***Apparatus Dept., General Electric Company, Schenectady 5, N. Y.***

GENERAL ELECTRIC

FOR FOOL-PROOF SAFETY EVERY TIME
IN CUTTING MOTORS FROM THE LINE,
THIS FEDERAL RELAY DOES THE TRICK
WITH THOSE WHO KNOW—
IT'S BOUND TO CLICK!



FEDERAL
OVERLOAD RELAYS
STANDARD EQUIPMENT ON



Federal NOARK
MAGNETIC
MOTOR STARTERS

Wherever overload protection is needed . . . whether on new or existing installations . . . Federal's Overload Relays will provide the "plus-margin" of dependability generally associated with Federal products. Naturally, these relays are built into Federal Noark Magnetic Starters . . . but remember, too, that they're available for your special applications. Federal Overload Relays provide conveniently located load and control circuit terminals, often making additional terminal blocks unnecessary.

DESIGNED FOR AUTOMATIC OR MANUAL RESET

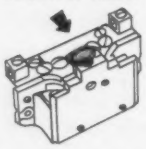
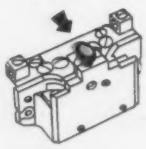


Diagram shown above illustrates Plunger (arrow) set for "automatic" reset.



Plunger is set for "hand" reset in above diagram.

FEDERAL ELECTRIC PRODUCTS COMPANY, INC.
EXECUTIVE OFFICES: 50 PARIS ST., NEWARK 5, N. J. • PLANTS: HARTFORD, CONN. • NEWARK, N. J.

Positioning Equipment (316)

D-c positioning and indicating equipment which may be operated from any a-c or d-c line has been developed by Allis-Chalmers Mfg. Co. for use where remote indication and control systems are employed. According to the manufacturer, immediate receiver response is attained over the entire operating range of the system. The receiver is a positioning unit in which the relative strength of the magnetic fields of the stator determines the position that its permanent magnet rotor will assume. Any change in this relationship of the field strength causes the rotor to turn and assume the position corresponding to the new resultant of the two fields. The receiver torque is a function of the displacement between the rotor and the magnetic axis of the receiver.

The transmitter is essentially a variable resistance bridge and controls the relative strength of the receiver magnetic fields. Receiver and transmitter torques are independent and the receiver torque required to move a device has no effect on the transmitter. The transmitter is designed to operate any number of receivers within rated capacity at any specified direct-current voltage.

Six sizes are available, at present, ranging from 5 oz. in. to 350 lb. in. approximate pull-out torque.

Elastic Plastic (317)

Glenn L. Martin Co. will make an elastic plastic, Marvinol resin, which it claims will be suitable for multi-colored wire insulation, gloves, transparent garden hose, various kinds of tubes and other items. Marvinol type resins are said to vary from a rigid to a soft rubbery state, to have excellent chemical resistance, light and heat stability, and, when compounded, unusual wearability.

Bottle Sterilizer (318)

Electrical Industries is making a baby bottle sterilizer holding six bottles, nipples and caps, two spoons and funnel. Exhaust vent relieves steam pressure inside bottles; automatic control prevents overheating, the manufacturer states. Four-foot cord and plug are supplied with the sterilizer.

Colored Flanges (319)

Marion Electrical Instrument Co. has a new line of round or square interchangeable colored flanges for its 2½-and 3½-in. hermetically sealed electrical indicating instruments. In both round and square shapes, these flanges are available in 12 different irridescent colors.

FM Converter (320)

Hallicrafters Co. is producing a converter to adapt prewar FM sets to the new band of 88 to 108 megacycles assigned FM by the FCC. This converter uses a single tube and, according to the manufacturer, it is small enough to fit inside practically any FM cabinet.

Portable Welder (321)

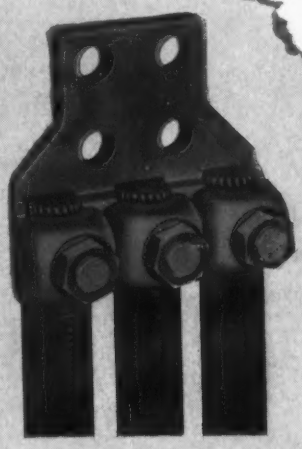
Tweezer-Weld Corp. has a new portable spot welding machine for parts .0005 to ⅛ in. round. A pair of insulated forged copper tweezers and a foot switch are connected to the cabinet. The welder plugs into 115-volt, 60-cycle supply and may be adapted to 220 volts.

"reconvert Qikly"

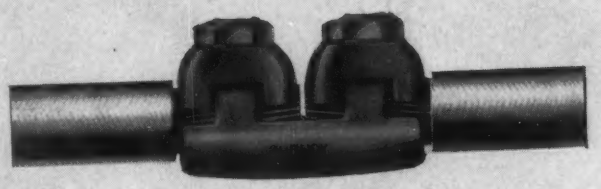
with **Burndy**

QIKLINE CONNECTORS

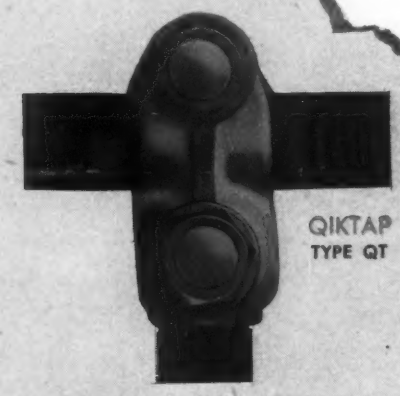
Install quickly with an ordinary wrench —cast of high strength, high copper alloy—high compression contact assured by oversize studs—each size takes broad range of cable sizes—Send for CATALOG No. 41. Burndy Engineering Co., Inc., 107V Bruckner Blvd., New York 54, N. Y.



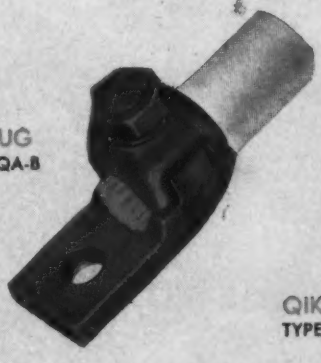
QIKLUG
TYPE Q3A-B



QIKLINK
TYPE QR-B



QIKTAP
TYPE QT



QIKLUG
TYPE QA-B

QIKSTUD
TYPE Q2DN

Headquarters for CONNECTORS

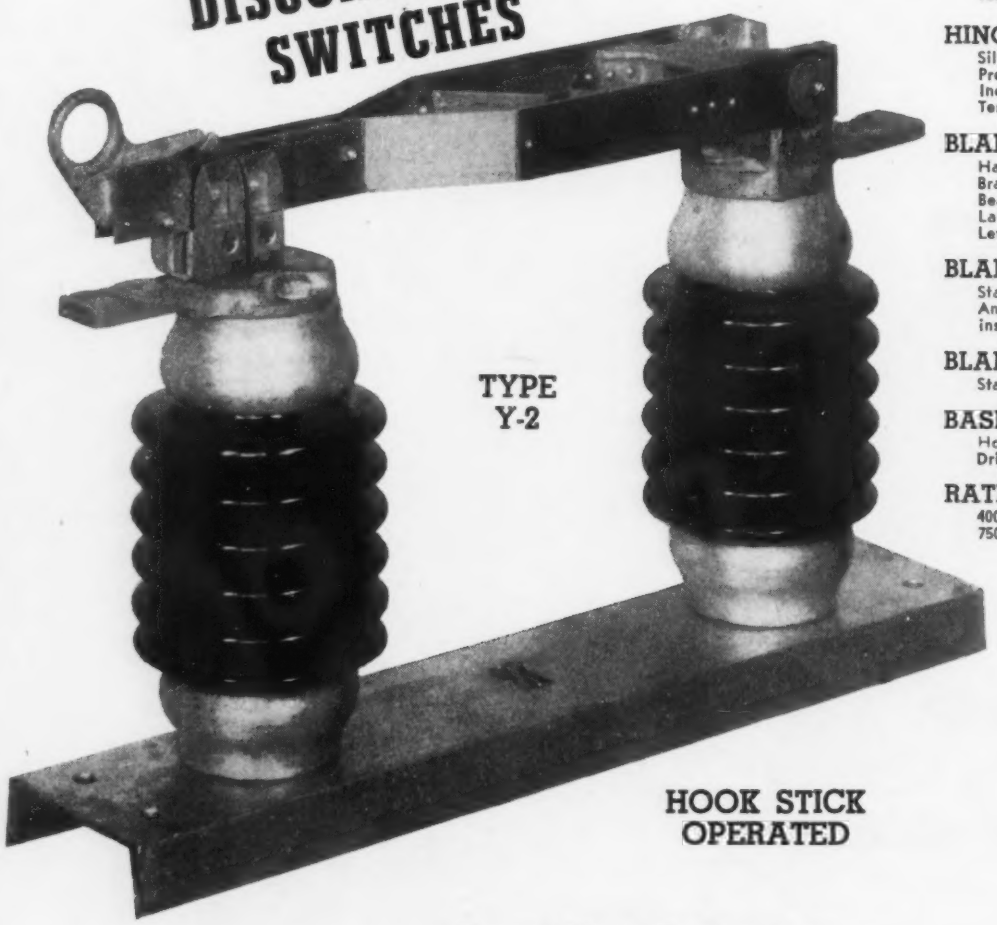
Burndy

Cole Electric Co.

1510 So. Los Angeles St. Los Angeles (15), Calif.

PRospect 2068

DISCONNECTING SWITCHES



TYPE Y-2

HOOK STICK OPERATED

CLIP END CONTACT
Pressed Copper Shoes
Silver to Silver Contact
Self Aligning
Short Current Path
Individual Stainless Steel Springs
Terminals 1¾" Drilling

HINGE END CONTACT
Silver to Silver
Pressure maintained by Individual Spring Washers
Terminals 1¾" Drilling

BLADES
Hard Drawn Copper
Braced by X Copper Straps
Bearing Yoke at Hinge End
Large Pull-out ring
Leverage pryout

BLADE STOPS
Standard Equipment
Angle can be changed after installation, if necessary

BLADE LOCKS
Standard Equipment

BASES
Hot Dip Galvanized
Drilled to specification

RATINGS
400 to 6000 Amperes
7500 to 161,000 Volts

Power Plant Equipment

AIR BREAK SWITCHES MANUALLY OPERATED
AIR BREAK SWITCHES MOTOR OPERATED
DISCONNECTING SWITCHES
BUS AND CABLE FITTINGS
BUS AND CABLE SUPPORTS
FUSE MOUNTINGS, FUSES
SWITCHBOARDS
INDUCTION RELAYS

Pacific Coast Representatives

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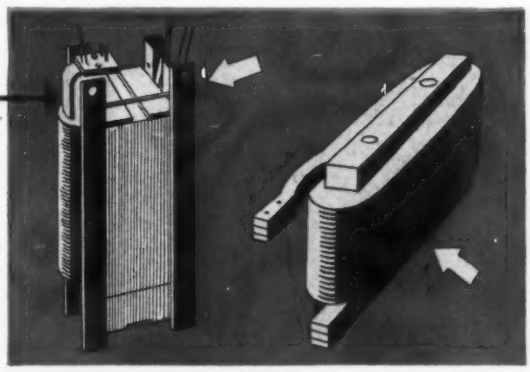
Seattle (4), Washington
Eliot-2722

EARL S. CONDON CO.
357 So. Hill St.
Los Angeles (13), Calif.
MI-2831

3 LEADERS *in internal curing*

INSULATING VARNISHES

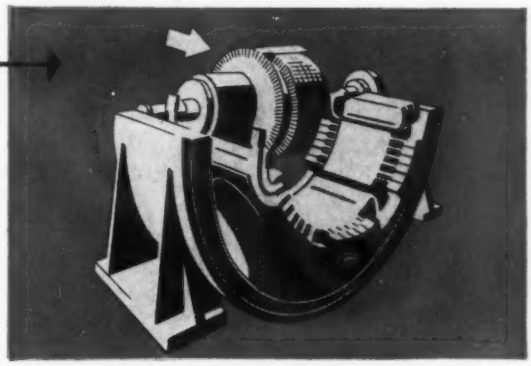
For Transformers



IRVINGTON #100

A clear internal drying varnish noted for long-life at high temperatures. Life test of over 1100 hours at 105°C. Thorough penetration and curing is obtained even in the deepest windings. Provides firm, though flexible, transparent bonding, so clear that coded leads are readily identified. Possesses excellent electrical properties, and is oil, acid and moisture resistant.

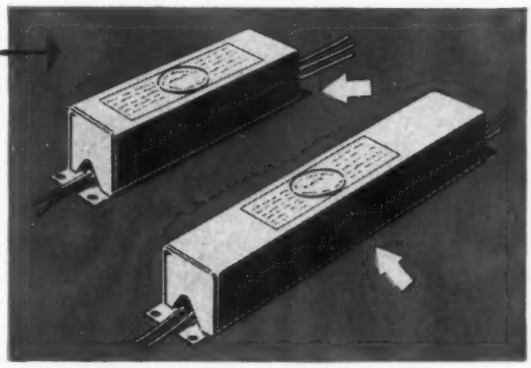
For Motors



HARVEL #512C and 612C

Phenol-aldehyde type varnishes derived from Cashew Nut Shell Liquid. Set dry throughout by heat induced chemical polymerization, thus cannot leave gummy half-cured interiors. Provide high insulation resistance at all temperatures, and are outstanding in this feature at operating temperatures up to 300°F. Extremely resistant to acids, alkalis, moisture, and oilproof.

For Fluorescent Transformers and Ballasts



HARVEL #612C

Now widely used by Fluorescent Ballast manufacturers, because the unique structure of this cashew varnish aids greatly in keeping ballasts hum-free.

All the above varnishes will cure most satisfactorily under conventional convection baking methods, or infra-red. For complete information write Dept. 44, Irvington Varnish & Insulator Company, Irvington 11, New Jersey.

IRVINGTON *Varnish and Insulator Company*

Irvington 11, New Jersey, U.S.A.

LOOK FOR THIS STARTER

In the RED PLASTIC Can

IT LEADS THEM ALL

Pat. Nos. 2200443—2228210

Locks Out . . . Resets AUTOMATICALLY

1. Positively cuts out deactivated, flickering, blinking lamps.
2. When trouble is detected the starter automatically cuts off current to the ballast and lamp.
3. Gives long life to ballast because defective lamp is locked out. Prevents overheating.
4. When Lloyd AUTOMATIC locks out defective lamp—turn off the current—Remove defective lamp—Put in a new lamp.
   Allow at least one minute to make the above change of lamps. Turn on the current. The starter automatically lights the new lamp.
   NO NEED TO DO ANYTHING TO THE STARTER
5. Lloyd NEW PLASTIC CAN has higher dielectric strength, is stronger, lighter, distinctive.
6. Knurled rim on plastic can insures positive grip for insertion and removal of starter.
7. Plastic can is sealed. No projecting lugs to cause trouble.
8. The life of the AUTOMATIC starter is many times greater than that of the average lamp.
9. It saves maintenance costs and power consumption, protects and insures longer life to the ballast and lamp.
10. Tested in production and prior to shipment to insure perfect performance.

Lloyd Automatic Available in FS-40 and FS-100

LLOYD PRODUCTS COMPANY

Dept. EW-3 Providence 5, R. I.
Representatives in 23 Leading Cities—Export Office: 13 E. 40th St., N.Y.C.

Connector (322)

AiResearch division of the Garrett Corp. has developed an electrical connector called the WilliamsGrip, which produces contact pressure by means of expansion or contraction actuated by a special thread. According to the manufacturer, one-quarter turn is required to make or break a positive

connection strong enough to suspend a 650 lb. safe in mid-air; a permanent wrench connection will withstand 1,600-lb. pull. It is stated that at 100 amp. this connector has a maximum millivolt drop of only 1.9 and, with 100% overload, it operates from 5 to 25° F. cooler than the cable. It is insulated to withstand 600 volts.

Mobile Radio Telephone (323)

Western Electric Co. has developed an FM mobile radio telephone system for installation in vehicles operating in urban areas. This set will make immediate contact with any telephone reached by the Bell system, according to the company announcement, and each car will have an individual telephone number so that only the bell in the vehicle called will ring. If the driver is absent when called, a light will be glowing in the control unit upon his return. The equipment consists of a radio transmitter, radio receiver, control unit, antenna and cable. The control unit is mounted under the dashboard, the antenna on top of the car; the rest of the equipment need not be visible. Operating power is derived from a heavy-duty 6- or 12-volt car battery with oversized generator. Standby power is 60 watts. Frequencies, pretuned and crystal controlled, range within 152-162 megacycles.

Recorder (324)

Ess Instrument Co. has made available its operational recorder for continuous record of time on and time off of multiple operations. This instrument may be provided with a single-acting pen, two-position double-acting pen or a three-position pen. As many as six single- or double-acting pens may be combined on a single chart, according to the manufacturer. It can be supplied in 115 to 230 volts a-c or with special voltages on application. A-c clock mechanisms are available from 15-min. periods to eight days.

Induction Heater (325)

Marion Electrical Instrument Co. has made available its induction heater designed for production soldering. This instrument was developed for soldering small parts and for soldering metal to metallized glass and ceramics. It is said to consume 775 watts at full load and 100 watts on standby, with power drawn only during soldering operation. Furnished in a standard relay rack cabinet, this unit measures 15¾x21½x15 in., weighs 150 lb., operates on 115-volt, 60-cycle power supply.

The extensive line of

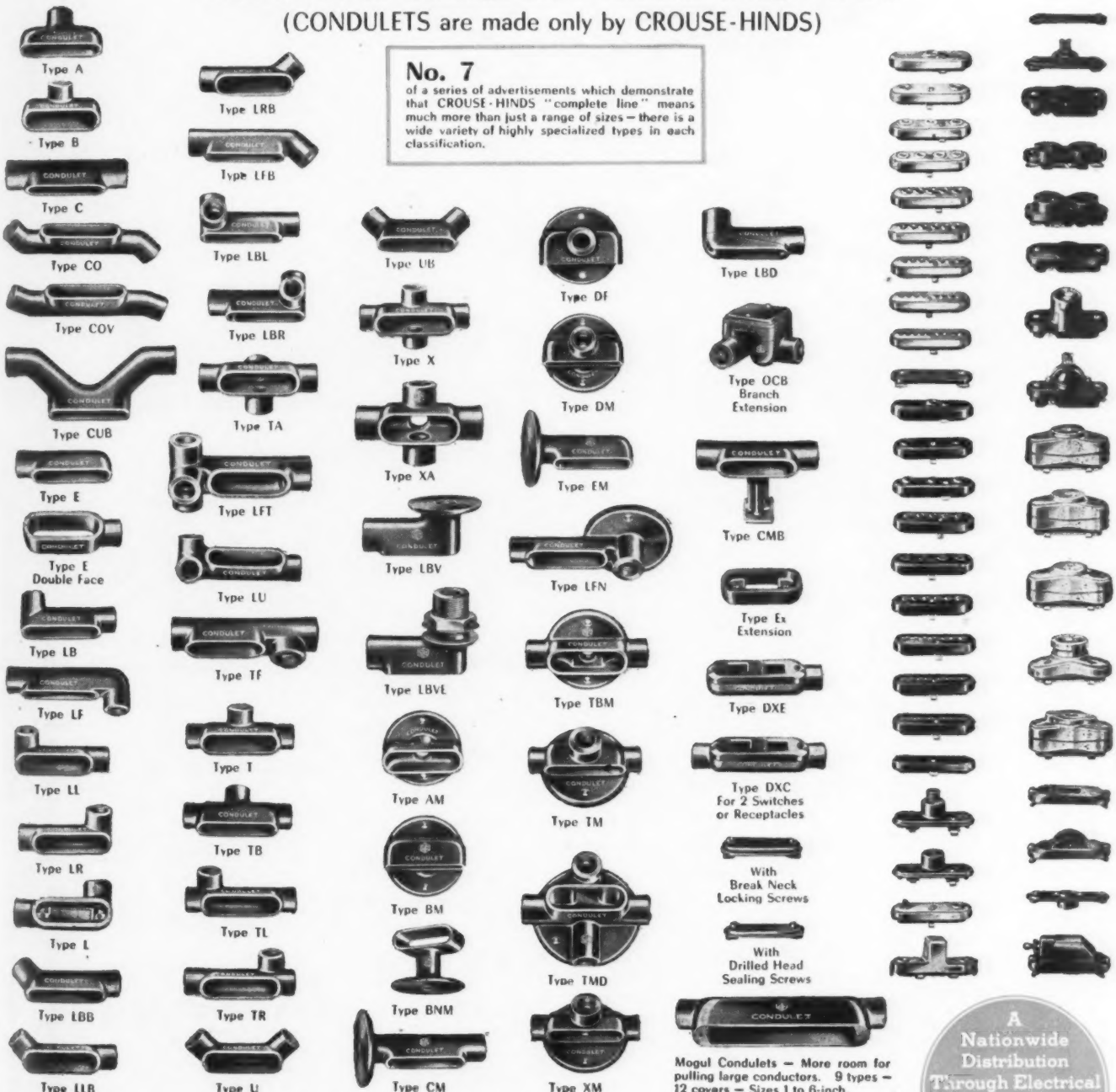
Obround CONDULETS

simplifies your installation problems.

51 types of bodies — sizes 1/8 to 6-inch — a wide selection of interchangeable covers and wiring devices.

(CONDULETS are made only by CROUSE-HINDS)

No. 7
of a series of advertisements which demonstrate that CROUSE-HINDS "complete line" means much more than just a range of sizes—there is a wide variety of highly specialized types in each classification.



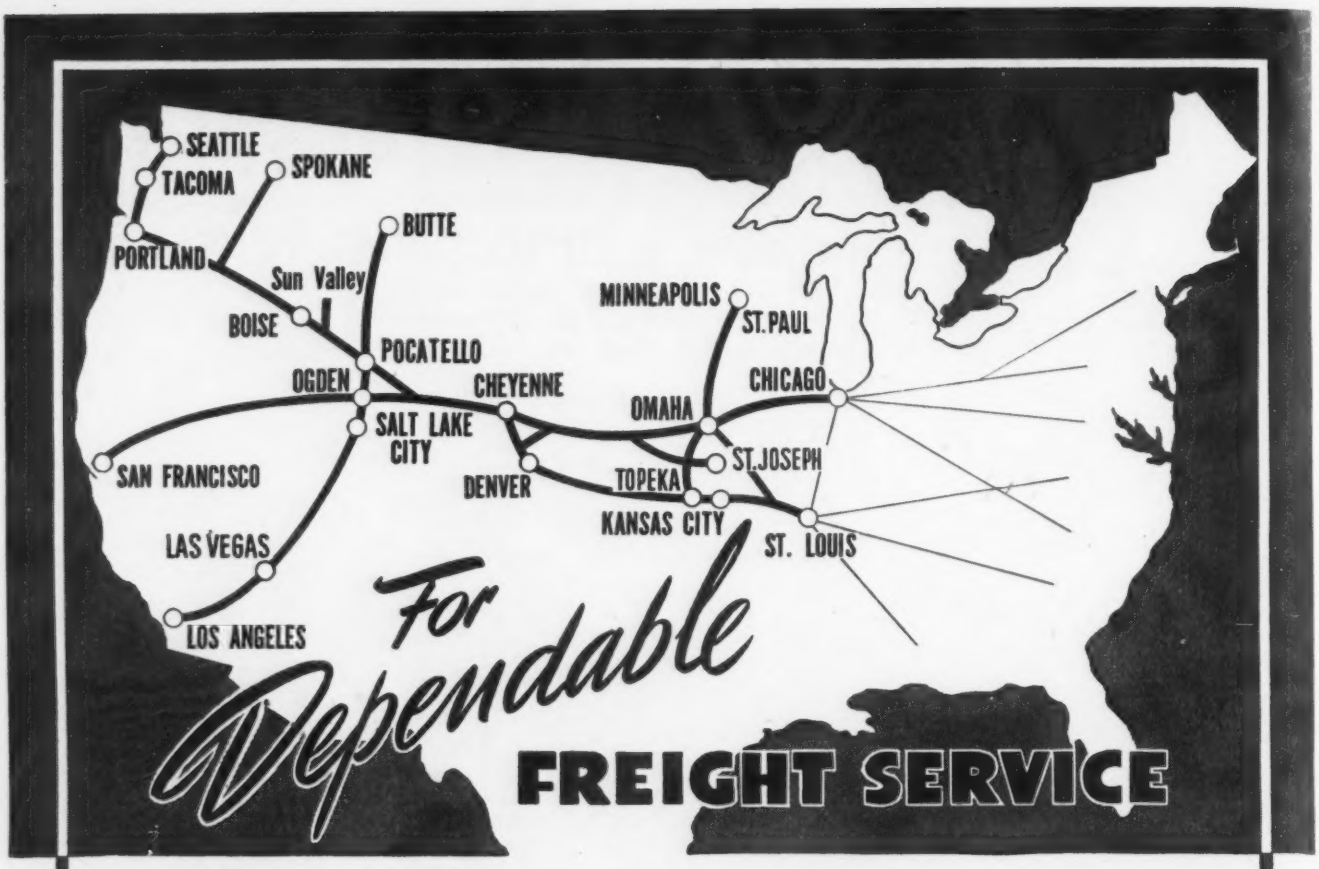
Complete listings of each type are in Condulet Catalog No. 2500

A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY
Syracuse 1, N. Y., U.S.A.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — San Francisco — Seattle — St. Louis — Washington. *Resident Product Engineers:* Albany — Atlanta — Charlotte
CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS



FOR ALL SHIPPERS—the Union Pacific Railroad provides . . .

A Strategic Middle Route that unites the East with the Mid-West, Intermountain and all Pacific Coast states.

Modern operating facilities, equipment and motive power include the famous "Big Boys," super-powered locomotives designed to meet industry's heaviest demands.

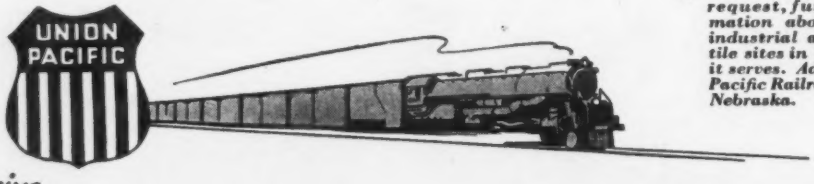
Union Pacific also has long been renowned for its well-ballasted steel highway, specially constructed for smooth, safe operation of freight traffic at high speed.

General agency offices are located in metropolitan cities, coast to coast, with a staff of experienced traffic men trained to assist you and other shippers in effectively meeting your transportation problems.

For dependable, on-the-job freight service—

Be Specific—say "Union Pacific"

★ *Union Pacific will, upon request, furnish information about available industrial and mercantile sites in the territory it serves. Address Union Pacific Railroad, Omaha, Nebraska.*



The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route

Where Keeping Lighting Levels Up and Upkeep Down is Really a Problem, Specify

BENJAMIN STEELITES

3 Types of STEELITES insure most suitable kind of light distribution

Narrow Beam Units for lighting relatively small areas to a high intensity; or where units must be mounted a considerable distance away from working surface.

Concentrating Units for lighting high narrow bays.

Spread Units for general illumination requirements.

THERE'S a special answer to the problem of sustaining lighting levels and minimizing lighting interruptions in locations where lighting units are subject to severe mechanical strains, smoke, vapor or dust. That answer is the BENJAMIN ARMOR CLAD LIGHTING UNIT, a specially designed unit for the lighting of such locations as Steel Mills, Foundries, Forge Shops and other similar locations. This unit is being employed in thousands of locations, for general illumination where illumination levels are required ranging from TWENTY TO ONE HUNDRED FOOT CANDLES and more!

STEELITE is made to stand up under the most severe service conditions. Where such conditions prevail, its use cuts maintenance costs. Further, you are assured of getting all the light you pay for and your employees need to do and feel their best. Check its features as highlighted here and given in complete detail in the FREE DATA BULLETIN SENT ON REQUEST. Write Benjamin Mfg. Co., Dept. J. Des Plaines, Illinois.

BENJAMIN
TRADE MARK

"STEELITE" *Armor-Clad Lighting Equipment*

Listed as Vapor-Tight by Underwriters' Laboratories
Distributed Exclusively Through Electrical Wholesalers

1213

WRITE FOR DATA BULLETIN FOR THE COMPLETE STEELITE SPECIFICATIONS

1. **HOUSING,** heavy gauge, porcelain enamel steel, specially processed to resist corrosive atmospheres; protects reflector against damage from flying particles or rough handling.
2. **REFLECTOR,** multi-conical Alzak aluminum, specially designed for the most exacting, efficient light control; in three arrangements to provide three forms of light distribution.
3. **GLASS COVER,** resists heat; unaffected by severe temperature changes; four times stronger than ¼ inch plate glass; won't shatter under hammer blows!
4. **COVER SEAL,** protects interior from dust, moisture, corrosive gases; special hinged construction, facilitates opening and servicing.

NOW AVAILABLE!

GOVERNMENT SURPLUS

METALS

FOR IMMEDIATE DELIVERY

THE Western Regional offices of the War Assets Corporation have joined together in a cooperative sales offering of ferrous and non-ferrous metals. If items you seek are not listed, you may be able to obtain them through the nearest War Assets Corporation office.

COPPER TUBING

Hard or soft drawn seamless, in coils or various straight lengths (crated). Various diameters and thicknesses.

ALUMINUM

Sheets and tubing in various sizes, thicknesses and specifications (San Francisco). Bars, rods, tubing and extrusions, (Los Angeles).

BRASS

Brass pipe, Grade A seamless in 12 to 16 foot random lengths ½" to 5" diameters.

PIPE

Small inventories of: cast iron and steel pipe in various sizes; fittings including reduction couplings, tees and elbows; well casing; lap-weld and galvanized pipe; and steel tubing.

VALVES

A broad range of valves in various sizes and materials including wedge gate, swing, check, float, globe and plug, with wheel, wrench or hydraulic control.

CABLE - WIRE ROPE

Choice selection of cable in various sizes (with hemp or fibre core) including guy-wire type galvanized or tinned. Also heavier cables with serration, suitable for bonding, guying, guard rails, etc.

LEAD BASE ALLOYS

Limited inventories of babbitt and solder. Determine availability through nearest W.A.C. office.

STEEL

PLATES

Sheared or milled plates in wide range of sizes carried in most W.A.C. western inventories.

SHEETS

Limited supply in scattered locations (broken lines). Hot rolled alloy sheets (SAE 9130) from 7 to 14 ga. varied widths from 29" to 70" and lengths from 86" to 168", available from San Francisco inventory.

BAR

Good supply carbon square, and octagon in varying lengths and diameters.

Production bars, round mild steel in 20 foot lengths, available at Spokane or apply to nearest agency.

STRIP

Varying thicknesses and widths (in rolls and flat).

STRUCTURALS

Broad inventory in various dimensions and specifications.

MILL STOCK

Various sizes and analyses, available at Salt Lake City.

WAR ASSETS CORPORATION

A subsidiary of Reconstruction Finance Corporation

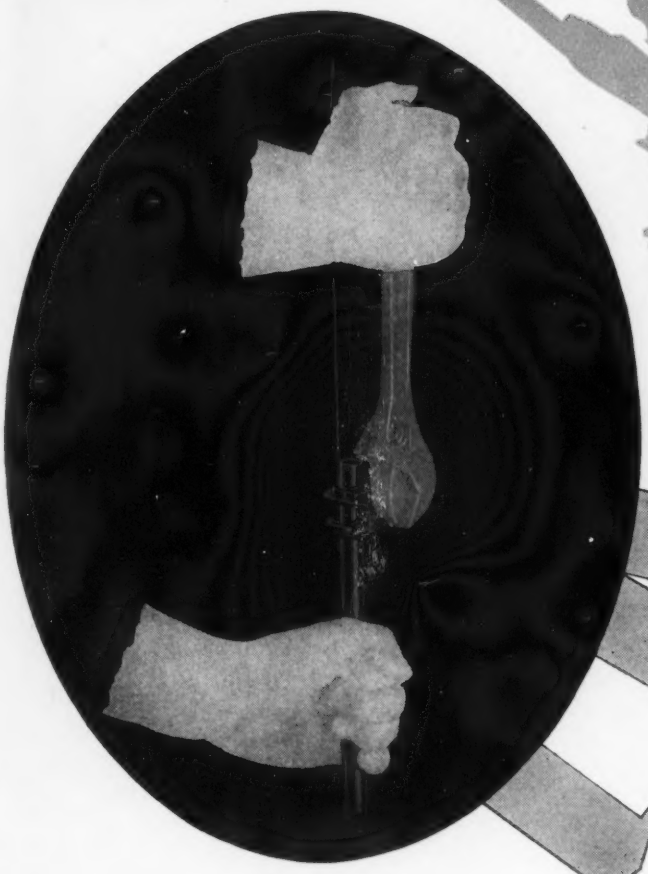
Items offered subject to prior sale or withdrawal. Buying preference to Veterans of World War II.

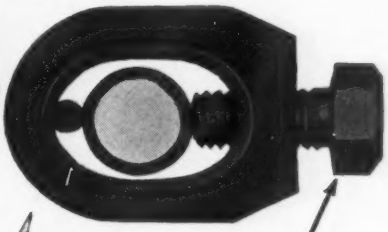
WESTERN OFFICES: Boston Building, DENVER, Alpine 0415 • Power Block, HELENA, Phone 481 • 215 West 5th St., LOS ANGELES, Michigan 6321 • Pittock Block, PORTLAND, ATwater 6401 • Dooly Bldg., SALT LAKE CITY, 5-7503 • Dexter Horton Bldg., SEATTLE, Main 1080 • Columbia Bldg., SPOKANE, Main 5111

262

HERE'S WHY YOU GET LONGER SERVICE FROM THE NEW Reliable GROUND ROD CLAMPS

MADE IN THREE SIZES:



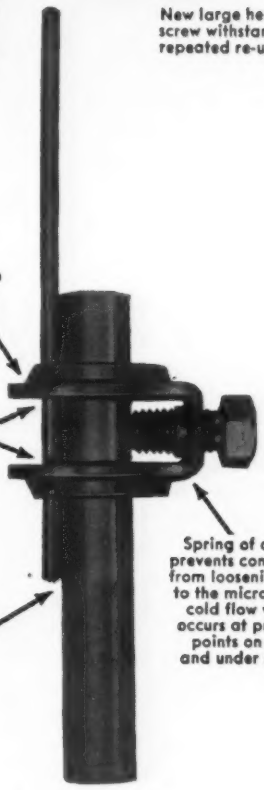


New large head screw withstands repeated re-use.

EVERDUR NON CORROSIVE MATERIAL

WRITE FOR NEW PRICE SHEET GI-DATED 9-45

Size of rods accommodated plainly marked on each clamp.



Embossed design permits use of highest grade material at low cost.

Clamp bears on wire at two high pressure points.

Spring of clamp prevents connection from loosening due to the microscopic cold flow which occurs at pressure points on wire and under screw.

Ground wire makes contact directly against rod.

Reliable ELECTRIC COMPANY
3145 CARROLL AVENUE
CHICAGO 12

OVER 35 YEARS Service TO THE UTILITIES

ALL MEMBERS OF THE

KLEIN

FAMILY

The Klein family of side-cutting pliers, N.E. type, includes five sizes: 9, 8, 7, 6 and 5-inch. They offer to good workmen a tool to fit every job where side-cutting pliers are applicable.

The handsome appearance and modern design are indicative of the high quality and the hand-craftsmanship methods that have made Kleins the choice of men who know good tools—for almost a century.

The big husky nine-inch size will handle those tough heavy jobs where weight and strength are needed. The compact five or six-inch sizes are ideal for getting into tight places. Thousands of electricians habitually carry a pair of 7 or 8-inch Kleins —good all-round tools.

Klein pliers are now in production but, of course, the demand exceeds today's supply. Your supplier will enter your order and furnish you with these quality tools as soon as possible.

ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York

Since 1857

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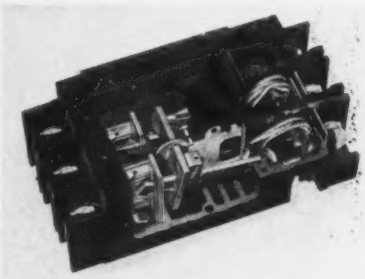
Circuit Breaker (326)

Square D Co. is making a 100-amp. frame circuit breaker, with ratings 15 to 100 amp., 600 volts, a-c, 50 to 100 amp., 250 volts a-c, d-c, two and three pole. This unit is said to be dust resistant, is sheet steel enclosed, with front operated handle. It is available for three- and four-wire solid neutral application. Weatherproof, dust-tight and explosion resisting enclosures are available for Class I Group D and Class II Group G hazardous locations. Dimensions of the breaker are 9 9/16 in. long, 4 15/32 in. wide, 3¾ in. high, 4⅞ in. maximum height, including handle. It is furnished also for panel boards.



Switch (327)

Robert Hetherington & Son has announced a renewable switch slightly over 1 in. long and ¾ in. high. Underwriters' approved at 15 amp., 110 volts a-c for either motors or resistive loads. This switch can be used in a single-hole mounting and has two flat studs protruding out the back, to which lugs may be attached. When the switch is used as a renewable type, the studs slide down between two contact bars in the back of the cradle. The front of the switch slides down through a slot in the front part of the cradle, which is attached to any flat surface by counter sunk screws. Available at present are single-pole single-throw switches, either normally open or normally closed.

Tubes (328)

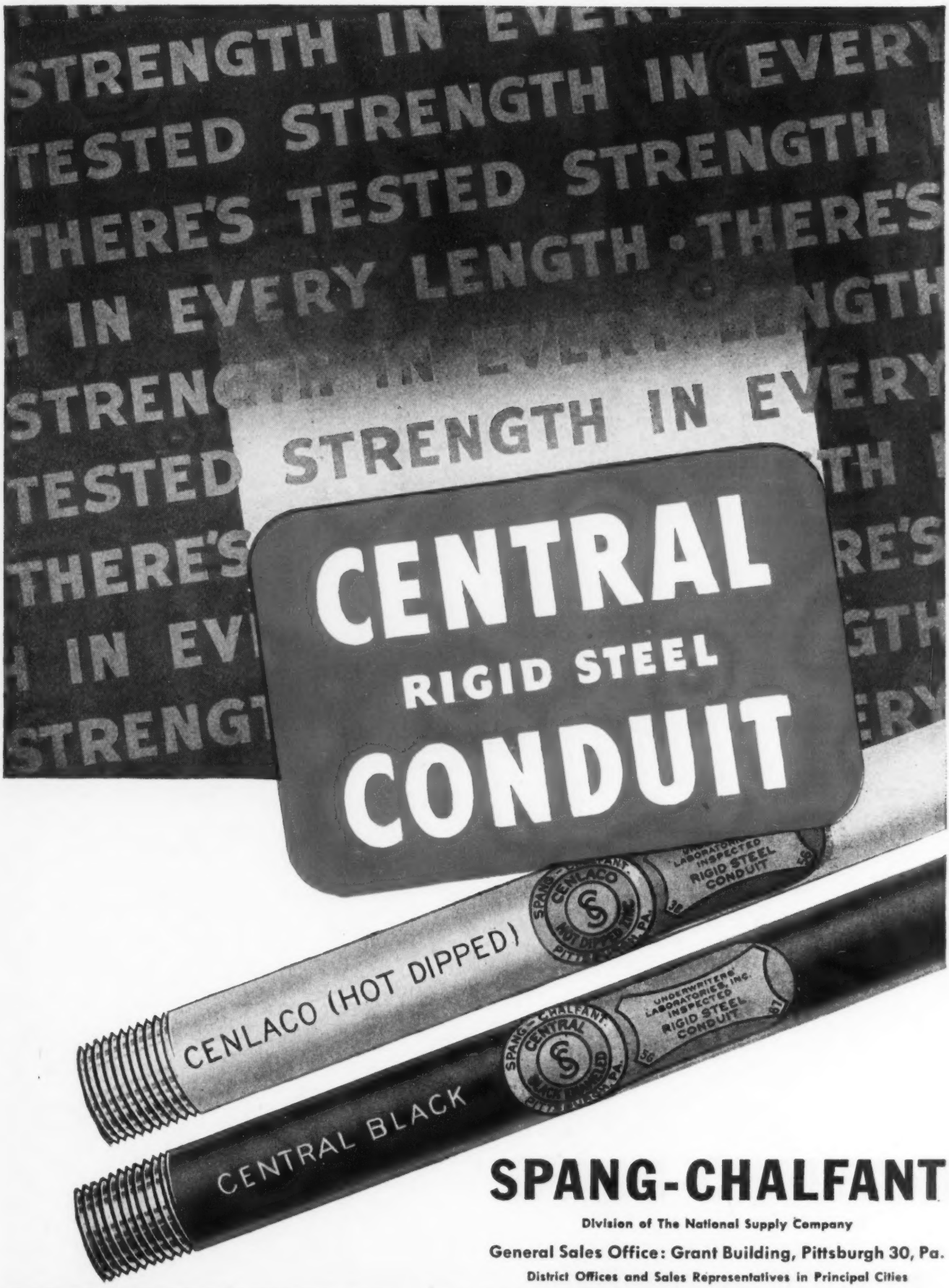
Sylvania has two new types of hydrogen thyratrons for industrial electronic and pulse communication service. Applications include high-speed welding, electroplating, electro surgery and high-speed photography. Features claimed for the tubes include low deionization time, rapid switching rates, high peak currents, high plate voltages, moderate trigger requirements, ability to operate at zero bias, operation over wide ambient temperature range, low tube voltage drop.

PF Regulator (329)

Modern Control Equipment Co. is offering a power factor regulator, claimed to raise power factor by taking the magnetizing current off the line. Called the Haug system power factor regulator, the unit is small, has no moving parts and requires no fireproof enclosures, no discharge coils or other safety devices, according to the manufacturer. It is made under AIEE specifications and NEMA standards.

Interval Timer (330)

R. W. Cramer Co. has a new electric interval timer, which it states has improved design and construction, featuring larger dials, sturdier frame and simplified screw mountings, designed to conform to standard instrument practice.



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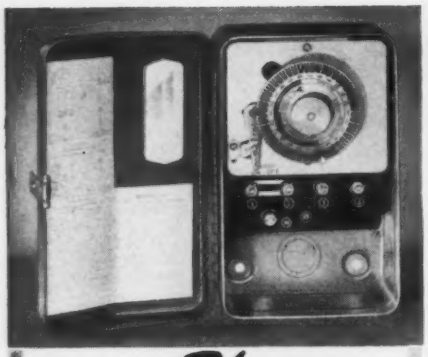

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Paragon Chicago
BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

BULLETINS

data books, etc.

Electron Tubes (331)

Sylvania is offering a booklet giving typical operating conditions, characteristics and tube base diagrams for more than 450 types of electron tubes used in radio receiver and industrial electronic applications. Tube base diagrams are also available separately, printed on card stock and punched for wall mounting.

Switches (332)

A Delta-Star publication describes the company's improved MB-39 pole top and outdoor substation multipole switches in ratings from 7.5 to 161 kv. and capacities from 400 to 1,200 amp., manual or motor operated. Dimensions are given for switches with center bolt, 3- and 5-in bolt centers cap and pin insulators. Illustrated.

Revised Catalogue (333)

Cannon Electric Development Co. has revised its catalogue of Type AP plugs and receptacles. The series originally was designed for the U. S. Army Signal Corp. but has been used elsewhere in radio and telephone sound circuits.

Traffic Appliances (334)

A booklet describing its line of traffic appliances has been prepared by the Miracle Electric Co. The line includes a food mixer, coffee maker, irons, roaster, vacuum cleaners, toasters, grill and hot plate, flour sifter, two types of massagers.

Coaxial Cable (335)

A data sheet issued by Simplex Wire & Cable Co. covers its high-frequency coaxial cable.

Instrument Data (336)

A general catalogue has been prepared by Bristol Co., listing its line of automatic controlling, recording and indicating instruments and giving suggestions for use. Line drawings are used to show basic application methods.

Proximity Fuse (337)

Cornell-Dubilier tells its part in development of the V-T proximity fuse, in an illustrated pamphlet recently off the press.

Lighting Catalogue (338)

Mitchell Mfg. Co. covers its complete line of commercial fluorescent luminaires in its recently issued Catalogue No. 285. Included are two- and four-light units in glass-shielded, louvered and open types, for single or continuous row installations, surface or suspension mounting. Description, picture and light calculation table is given for each model. Mounting and serving data also is furnished.

Adjustable-Speed Drive (339)

A 16-page booklet of data on its magnetic adjustable-speed drive has been published by Electric Machinery Mfg. Co. Operation, performance characteristics and applications are treated.

Electrical Insulation (340)

Properties of Fiberglas electrical insulation materials and test data are contained in a 12-page bulletin released by Owens-Corning Fiberglas Corp.

Disconnecting Switches (341)

Railway & Industrial Engineering Co. has a new bulletin giving data on its outdoor disconnecting switches.

Air Conditioning (342)

Carrier Corp.'s five air conditioning systems are described in a 40-page booklet recently released.

Restaurant Lighting (343)

Lighting for the modern restaurant is treated in a recent bulletin in General Electric's series on postwar illuminating design.

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333	334	335	336	337	338	339	340	341	342	343

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ELECTRA'S HUSBAND

Don't Do It, Son

"WITH two experts like you here tonight I ought to call the Smiths and have both father and son come over," Electra said one evening recently as we were leaving the dinner table with a guest from the south.

"What gives?" I asked.

"I wish you wouldn't use that slang you pick up from your nieces and nephews," Electra admonished. "It only encourages them to ape you more. You know how you've taught them to swear."

"Taught nothing. They copy," I said. "But what about the Smiths?"

"Well you probably heard that Tommy finally is out of the Air Corps," Electra said. "Apparently he did a good job of saving his money. Anyway his mother told me today that his father is going to help him go into the radio and appliance business. His mother hoped that you could give them some good advice—like what makes to carry and who to see and where there might be a good place for a store. With John here tonight, it seemed to me that you both might help Tommy."

"Yes, we could probably help them," I said. "To save their money. But they wouldn't listen to us. What do you think, John?"

"Let Electra work on Mrs. Smith," our guest said. "Perhaps she can show her just how foolish the idea is."

"What do you mean foolish?" Electra interrupted. "Everybody wants new appliances. Why just in this house alone we need a dozen. I want an automatic washer and a drier and an ironer. We need two new radios and the refrigerator isn't big enough. I know a dozen women in the same fix. Why somebody is going to sell thousands and thousands of those things."

"We fervently hope so," our guest said. "And there are hundreds and hundreds of people like the Smiths—automobile dealers, professional men, owners of cocktail lounges, returning veterans, former salesmen who should know better, even an engineer like your husband—all thinking that the biggest killing in business history is going to be made in the home appliance field. As a consequence, no field is expanding more rapidly. And it's only natural because these people are following the dictates of experience."

"Well what's wrong then?" Electra asked.

"Several things," our guest answered. "In the first place we've always been taught that when there is a demand for things as you say there is for appliances and when people have money to pay for them as they have today, we have a market. With an assured market, then we have been taught that an expansion in the facilities to serve that market is warranted. Your husband will agree to that."

"John's right," I nodded.

"Up to here everything is fine," our guest continued. "But to satisfy that demand there must be production, and there's where the rub comes in. The American industrial and business economy is a production economy. Without production, the whole thing ultimately grinds to a stop and stalls. Labor strife has curtailed production immeasurably. Rigid price control—in fact any kind of price control—stifles it. All kinds of government red tape and regulations hold it back.

"Thus all of this expansion—in retail stores, in small plants, in service organizations — depends upon production and more production. If there isn't anything to sell, then there is no way of meeting the costs of doing business. One great industry may be held up here for the want of a few vital materials, another may be held back because just one component is lacking. Multiply that a few times and the effect becomes more and more far-reaching."

"Look Electra," I said. "How many appliance stores are there in your shopping district on Polk Street?"

"From Sutter to Union there must be a dozen, I guess," Electra answered. "That is if you count in the radio shops and the hardware stores that have appliance departments."

"How about out where the Smiths live?" I asked.

"I don't know because I've never paid any attention," she answered.

"Well I can tell you. Take the three or four blocks along where the Food Mart is. There is a big new store next to the night club, and both of the automobile dealers are putting in appliance departments. So is that super service station. There is a radio and appliance shop across the street and a couple more besides."

"But suppose Tommy Smith wanted to go out in the country to one of the smaller towns?" Electra asked.

"It's even worse," our guest said. "You've been through Auburn on the way to Lake Tahoe? Before the war there were three stores handling appliances there. Today there are thirteen. Down in southern California, appliance stores are thicker than filling stations. Now each of these businesses has been set up on the basis that it will have a certain volume of sales. In fact, each must do a minimum volume to stay in business. Well the production machine of the country has been stalled or slowed down to such a degree that there won't be goods enough to sell to provide that volume. Maybe they will receive seventy-five per cent of their expected total; maybe only fifty per cent. Then what happens?"

"They go broke," I interrupted.

"You fellows are terrible pessimists," Electra said. "I'll have to tell Mrs. Smith."

"We're not pessimists, Electra," our guest said. "We simply are looking at realities. This is a totally different age in which we are living today."

"Back before the war," I said, "figures showed that almost half of all new businesses failed in their first year. The average life of all retail stores was something like two and a half years. A study was made of several hundred electrical retailers. Only four out of every seven made any money at all. My recollection is that, on the average, the owners would have made more money as day laborers. And those stores operated on a margin of close to thirty-five per cent. The best dealer I ever knew had a sufficiently large volume so that he received average margins that ranged up to about forty per cent. He made money. But he couldn't now."

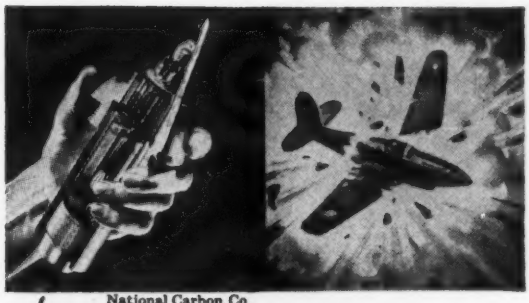
"Why?" Electra asked.

"Let me answer," our guest said. "The OPA sets the retail prices. It figures that a dealer can operate successfully on about a thirty-three per cent margin and it has established retail prices accordingly. Not even the largest merchants in business will receive the same margins that they did before the war. And many of their costs have gone up too."

"Isn't anybody going to make any money in the appliance business?" Electra asked.

"Sure, the salesmen," I answered. "That's what Tommy should be."

From VT FUZE



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Check your wiring plans before they check you!

DON'T BE PENNY-WISE AND POWER-FOOLISH

ANACONDA WIRE & CABLE COMPANY

ELECTRICAL WEST

MARCH 1946
VOL. 96 NO. 3

CHEAP POWER--- Let's Understand It

*J. J. Deuel**

Director, Public Utilities Department, California Farm Bureau Federation

DURING recent months there has been an increasing flood of propaganda released by the Bureau of Reclamation and other federal agencies which is continuously published in certain newspapers and repeated over and over again by individuals who for some personal reason support every detail of the bureau's program without making any analysis of the facts, or without realization that the statements they are repeating are not based on facts and are misleading. Unfortunately there are in California and other Western states, papers and people who print and repeat the statements and propaganda best suited to their ideas and purposes, but refuse to print or discuss facts that do not support their own particular ideologies.

We are frequently accused of representing the power companies. Certainly no man in this state has a better right to deny that allegation than I have, as I have filed more complaints and prosecuted them to a successful conclusion against private utilities in California than any other two or three men in the past 25 years. We are also accused of being opposed to public ownership. We again deny that allegation. We have supported the organization of irrigation districts and other cooperative movements ever since the inception of the Farm Bureau where they are organized and operated by the interested parties who own the land, use their services and pay the bill. We are unalterably opposed to that type of public ownership operated by bureaucrats by remote control from Washington. We are also opposed to any move by either private or public ownership which destroys combined or coordinated city and rural development and cooperation to the detriment of rural people. We fear some farmers do not realize the benefits which they receive from the diversified load of power companies which have the benefit of this combined coordinated service, and we know what their great disappointment will be if some day they find themselves securing service from a rural power district which has no other type of load except agricultural power service.

Statements Misleading

The reason for this discussion is to endeavor to offset the wholly unfounded and misleading statements which are continuously being made by representatives of the Bureau of Reclamation and the Interior Department, including the Secretary himself, which statements are repeated day after day by the Scripps-Howard and McClatchy newspapers. At the time of the dedication of the Friant Dam, Secretary Ickes told some of our farm leaders that if they would support him in place of the Army Engineers on Kings River development, he would furnish them agricultural power for 8 mills per kwh. instead of the 15 mills that they now pay.

When that statement was repeated to me, I knew that the use of the term "8 mills" was at least misleading, and the statement of "15 mills" was not founded on fact. I would have been reluctant to challenge this statement as I could only prove it by referring to some other party, but fortunately the Secretary under date of Feb. 10, 1940, transmitted to the Speaker of the House of Representatives a report by the Bureau of Reclamation, Department of the Interior, dated Jan. 23, 1940, covering the Pine Flat project on Kings River.

On page 33 of that report he sets up a table showing a power cost per kilowatt-hour of 4.9 mills. On the same page he states that it is anticipated that a distribution system can be provided at a cost for delivery service of 2.5 mills per kwh., and that after allowing for line losses the resulting cost of delivered power would be 8 mills per kwh. That forms the basis for his statement that he would furnish electric energy for agricultural power users at 8 mills. I submit that every assumption he used is impossible and could only be done by somebody else paying part of the cost.

On page 34 of the same report under the heading *Power Benefits*, I quote: "Present rates including the demand charge average about 15 mills per kwh., and a substantial saving would result even though the 8-mill rate need be increased somewhat." It happened that we had just completed making a study for possible rate adjustment purposes of agricultural power costs in the district which was included in the Secretary's statement, and the actual average price per kilowatt-hour paid by farmers in that district for the past two years was between 11 and 12 mills and not 15 mills. That is a fair example of how bureau representatives continue to stretch the cloth both ways to make their proposition look attractive.

* Based upon a recent series of addresses before Farm Bureau meetings.

I did not feel inclined to let this misrepresentation pass without a challenge. So under date of April 30, 1940 I wrote to the Bureau of Reclamation, Washington, D. C., as follows:

> We are very much interested in the statements made and figures quoted on pages 33 and 34 in the report of the Bureau of Reclamation on the Kings River project in California. We are particularly interested in the prospects of power at 8 mills per kilowatt-hour for agricultural pumping. In order to arrive at the distribution cost of 2.5 mills per kilowatt-hour shown at the bottom of page 33, it would have been necessary for your engineers to assume a certain rate of power consumption per horsepower per year in the area under consideration. Will you please advise us what annual consumption per horsepower was assumed in arriving at the distribution costs shown?

After a second letter we received the following reply signed by the acting chief engineer:

> In response to your letter of April 30, 1940, to the Commissioner regarding costs of power delivery, you are advised that the distribution cost of 2.5 mills per kwh. contemplates the following situation:
>
> (a) Independent distribution system starting from substations on main transmission line and terminating at customer transformer (customer to provide transformer).
>
> (b) Line losses charged to production.
>
> (c) Customer use for all purposes 2,600 kwh. per connected hp.
>
> (d) Amortization in 40 years without interest, on distribution system cost chargeable to pumping.

Facts Omitted

At this time I want to point out that the power for which the farmers paid approximately 12 mills during the past two years was delivered to the farmer's motor through facilities owned and maintained entirely by the power company. You will note from the chief engineer's letter that the 2.5 mill distribution cost used by the Secretary in his calculations provided for the customer owning and maintaining his own transformer and using 2,600 kwh. per hp. of connected load per year. That raises two important factors which make the Secretary's statement extremely misleading: first, the farmer is required to own his own transformer in the 8-mill proposition and what that really means will be covered shortly when we consider another communication; second, farmers are expected to use an average of 2,600 kwh. per hp. per year to obtain the 8-mill rate promised by the Secretary, but neither of those facts were mentioned in his promise.

There are five power distribution districts within the territory that might possibly be covered by the proposed Pine Flat project. Four of these are served by the Pacific Gas and Electric Co. and include Bakersfield, Selma, Corcoran and Fresno districts, and the territory served by the Southern California Edison Co. in the San Joaquin Valley. The average number of kilowatt-hours consumed annually by consumers of energy for any particular purpose is an all-important factor, and a careful check of the records of consumption in all of the territory covered by the districts just mentioned for the two years preceding the Secretary's statement show that in place of an average of 2,600 kwh. per hp. per year, the consumption in the Bakersfield district was 1,743; Selma, 1,535; Corcoran, 1,216; Fresno, 603; and Tulare, 1,546, or an average for the entire territory of 1,328 kwh.—only 28 kwh. more than half of the consumption required to meet the condition which the chief engineer says the Secretary's statement was based on.

Questions Submitted

In order to secure more information on this subject, on April 15, 1941, I submitted eighteen questions to the acting chief engineer of the Bureau of Reclamation. I will not take space to refer to all of them but want to direct your attention to three of my questions and his answers.

You will note under "(d)" in the engineer's letter quoted above, he states "amortization in 40 years without interest." Question No. 8 in my letter of April 15 asks: How can investment be amortized without interest in view of Section 9 of Reclamation Act of 1939? Answer: The estimates are based on the assumption that no interest will be charged on distribution system costs chargeable to pumping.

To show how the above answer conflicts with the law, I quote the 1939 amendment to the Reclamation Act:

> Any sale of electric power or lease of power privileges made by the Secretary in connection with the operation of any project or division of a project shall be for such periods not to exceed 40 years, and at such rates as in his judgment will produce power revenues at least sufficient to cover an appropriate share of the annual operation and maintenance cost, interest on an appropriate share of the construction investment at not less than 3% per annum and such other fixed charges as the Secretary deems proper.

Question No. 10—What would the cost of power per kilowatt-hour be if the average use per horsepower was 800 kwh. per hp. per year instead of 2,600 as mentioned in your letter? Answer: The distribution cost per kilowatt-hour for an average use of 800 kwh. per hp. per year would be approximately 8.1 mills per kwh.

You will note that the engineer fixes a distribution cost slightly in excess of 8 mills, while the Secretary in his letter to Congress used the figure of 2.5 mills. Looking at this another way, if you add the 5-mill production cost used by the Secretary, with which we do not disagree, to the 8-mill distribution cost in the engineer's answer to Question No. 10, we have a cost of 13 mills and the farmer owning and maintaining his own transformer bank.

Investment Factor

Question No. 17—Can you give investment necessary for customers in transformer overload relays, meters, service wires, and other costs necessary for installations from 5 to 50 hp., inclusive? Answer: The estimates include an investment of $400 per customer for meters, *transformers*, *poles*, service wires and line protectors. It is estimated that the customer expense for transformers would range from $300 for service to a 5-hp. pump to $2,000 for service to a 50-hp. pump. Overload relays are customarily provided as part of motor control equipment, so separate estimates do not appear practicable.

I wish I had time to analyze all of the 18 questions and answers, but you can readily see from what we have quoted that when all of the facts are taken into consideration, the offers of cheap power made by the bureau provide a higher cost to the consumer than he now pays to public utilities, in spite of the fact that out of what he now pays slightly more than one-third is taken for the support of government.

Propaganda Quoted

We would not be so much concerned about this matter if that type of misleading propaganda was not being put out almost daily by the Bureau of Reclamation and other government agencies and printed continuously by the press to such an extent that many of our people believe it to be true. I have here a press report from Washington under date of Oct. 29, 1945 which was published generally throughout California, and contains several statements which are, to say the least, misleading, but I want to call your particular attention to one statement attributed to Mr. Boke who has recently been appointed Director of the Bureau of Reclamation in the Central Valley district. I quote:

> In Washington Mr. Boke has been talking to members of the House Appropriations Subcommittee on Interior Department, which holds hearings this week on President Truman's request for an additional $18,500,000 to be spent at once on Central Valley project. He has been explaining to subcommittee members and to members of the California delegation that the cost of water to the farmers in every irrigation district is directly related to the cost of power.
>
> In the Waukena-Packwood area, where a new district is in process of formation, farmers now pay from 12 to 13 mills for elec-

tricity for pumping water onto their lands. The Reclamation Bureau, if allowed funds for carrying out its plans, could deliver electricity for this purpose for less than 5 mills, and without any standby charge, Mr. Boke said.

Mr. Boke has been stressing these figures in asking the Appropriations Committee for funds for building transmission lines to carry Shasta power as far at this time as Tracy.

This would be very interesting if true, but what Mr. Boke failed to explain to the California delegation and other members of Congress was that where the farmers in that district paid between 12 and 13 mills, it was for energy delivered to their motor over a complete system owned and maintained by the company making the delivery, while his offer of less than 5 mills was for delivery to a substation located along a transmission line belonging to the Bureau of Reclamation, and the farmers would have to construct and own a complete distribution system, including transformers, the cost of which when added to the wholesale rate would make the cost of energy delivered to their motor more than they now pay.

Load Factor

The rate quoted by Br. Boke also assumes a load factor of more than 50% while the actual load factor in the district under consideration is approximately 15%. Following are the wholesale rates quoted by the Bureau of Reclamation based upon various load factors:

Monthly Load Factor	Average Rate per kwh.
10	14.27 mills
20	9.03
30	7.02
40	5.90
50	5.12
60	4.60
70	4.23
80	3.95
90	3.74
100	3.56

Another matter which disturbs us very much and creates a complete lack of confidence in statements made by representatives of the Bureau of Reclamation is the situation in connection with the land limitation provisions of Reclamation Law. While the bureau and its supporters vigorously contest every effort that is made to modify such provisions, they are at the same time trying to promote the formation of districts to deal with the bureau, and saying that a family in California can have 320 acres, and that for as long as ten years they can have water for as much land as they own without limit as to the number of acres. When we examine the Reclamation Law, we are unable to find any support for such statements and we deny that even the Secretary of the Interior or any other government representative has any authority to modify the clear provisions of federal law, or that a man and his wife constitute two families even in California.

Federal Code

Here are three sections of the Federal Code:

Section 418. Private Lands Within Project: Agreement as to Disposal of Excess Over Farm Unit. Before any contract is let or work begun for the construction of any reclamation project adopted after Aug. 13, 1914, the Secretary of the Interior shall require the owners of private lands thereunder to agree to dispose of all land in excess of the area which he shall deem sufficient for the support of a family upon the land in question, upon such terms and at not to exceed such price as the Secretary of the Interior may designate; and if any landowners shall refuse to agree to the requirements fixed by the Secretary of the Interior, his land shall not be included within the project if adopted for construction.

Section 431. Water Right Applications Generally; Limitation as to Amount of Water; Qualifications of Applicant. No right to the use of water for the land in private ownership shall be sold for a tract exceeding one hundred and sixty acres to any one landowner, and no such sale shall be made to any landowner unless he be an actual bonafide resident on such land, or occupant thereof residing in the neighborhood of said land, and no such right shall permanently attach until all payments therefor are made.

Section 434. Amount of Land for Which Entry May Be Made; Farm Unit: Subdivision of Lands. Public lands which it is proposed to irrigate by means of any contemplated works shall be subject to entry in tracts not less than forty nor more than one hundred and sixty acres: *provided*, that whenever, in the opinion of the Secretary of the Interior, by reason of market conditions and the special fitness of the soil and climate for the growth of fruit and garden produce, a lesser area than forty acres may be sufficient for the support of a family on lands to be irrigated under the provisions of the reclamation law, he may fix a lesser area than forty acres as the minimum entry, and may establish farm units of not less than ten nor more than one hundred and sixty acres.

Considering the language of these three sections, I fail to find any justification for telling anybody that they may secure water for more than 160 acres. It is very evident that if the Secretary of the Interior felt less land was sufficient to support a family, he could legally fix a farm unit at something less than 160 acres.

For many years the Central Valley project was looked upon by California farmers as having as its primary object the conservation and better distribution of water, with electric power being produced as a by-product and used to help pay the cost of the project. Since the project has fallen into the hands of the Bureau of Reclamation they have attempted to make transmission and distribution of the electric energy generated by the project the primary object.

In spite of the offer by the Pacific Gas and Electric Co. to buy all of the energy the project might generate at a price to be fixed by the Federal Power Commission and the California Railroad Commission, the bureau has insisted it must have appropriations and be authorized to build transmission lines all over the great Central Valley or it would be at the mercy of one purchaser of its electric energy. They have continuously indicated that the need for these transmission lines was to make a more advantageous sale of the electric energy generated possible. Finally a contract was made with the Pacific Gas and Electric Co. at a figure which would pay all charges properly chargeable to electric power and a profit of $3,500,000 a year when the electric installations at Shasta and Keswick are complete. That eliminated the bugaboo of only one purchaser as a necessity for transmission lines, but did not satisfy the desires of the bureau to take over the electric power business, so a new scheme had to be developed. This resulted in the bureau offering to sell power to several cities, among them the City of Roseville. In order to have its offer accepted, it quoted a price delivered at Roseville which, based on the actual use of energy in 1944 by that city, would produce $2,950 *less* revenue than the bureau is now selling the energy for at the dam.

Economy No Object

That kind of dealing indicates to me that the bureau has no interest in the economical handling of the project, but is solely bent on getting into the transmission and distribution of electric energy in territory already served. The press I referred to formerly and the bureau representatives severely criticized the Pacific Gas and Electric Co. because it did not transport at its own loss energy to Roseville to enable the bureau of take business away from it. That refusal is now being used in Washington to urge the necessity of more appropriations for the construction of transmission lines to make it possible for the bureau to dispose of more energy for less than cost, making it necessary for its activities along that line to be subsidized either by tax payers or by users of other services of the project.

All of these matters I have referred to, together with many others of a similar nature, have convinced me that control of the Central Valley project by the Bureau of Reclamation is a most serious menace to California agriculture.

Protected Secondary Banks

Scheme for isolating faults while allowing transformers to carry short-time overloads proves itself in trial installations

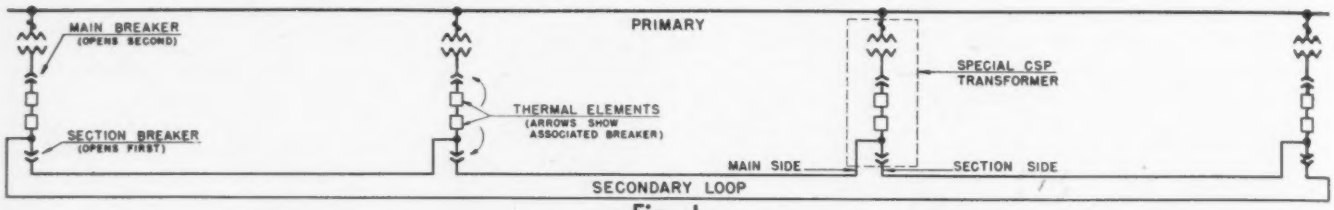


Fig. 1

ECONOMY through the use of banked-secondary transformers incorporating a special protective scheme is indicated by experience with two Western installations. One is on the Pacific Gas and Electric Co. system in Piedmont, Calif.; the other is on the Portland General Electric Co. system in Portland, Ore.

Both installations utilize Westinghouse special completely self-protected transformers, except that the PG and E equipment does not include lightning protection, as lightning is negligible in the area concerned.

The scheme of protection involved in both installations is represented in Fig. 1. This drawing does not take into account the exact type of secondary or the actual numbers of transformers. It merely serves to clarify the method by which the systems under discussion operate to isolate faults and drop overloads.

Salient feature of the scheme is the provision of two breakers on the secondary side, each actuated by its own set of bimetals which respond both to load current (which is passed through them) and to temperature of the transformer oil (in which they are submerged). In this way an accurate overload control which incorporates inverse time characteristics protects the windings from excessive heating.

The two breakers are built into the transformer and are designated as main and section. The main breaker is calibrated to trip at the same values as the single breaker in a standard CSP transformer. The section breaker is calibrated to trip at slightly lower values. This means that the section breaker will open first. Signal lights are provided to show breaker operation, and each remains lit until the associated breaker is manually closed.

Protective links are built in on the primary side, as is standard with CSP transformers, in order to clear the transformer from the feeder in the event of an internal fault.

The basic idea behind the whole two-breaker arrangement is to allow the transformers to carry large but safe overloads as long as possible and at the same time provide a secondary fault-isolating and load-dropping arrangement which will cause a minimum of disturbance to the other parts of the secondary bank. The better these are accomplished, the greater is the number of cases in which the efficiency and flexibility of secondary banking can be realized.

Banking Secondaries

A SURVEY conducted in 1943 showed that 48% of 166 power companies banked some of their distribution transformer secondaries.

SAVINGS usually run from 5% to 35% of installed transformer capacity and one or two sizes of smaller secondary copper; more reliable service with less tendency toward flicker usually result.

SIZE of banks may range from 2 to 200 transformers. In general the minimum is three so that loss of one transformer won't dangerously overload those that remain, and the maximum is about 10 in looped secondaries and 20 in gridded secondaries.

IT IS usually desirable that all transformers in a bank have the same rating.

BANKS may feed line, loop or grid-type secondaries, but in general the greatest benefits of banking are realized with a loop or grid.

DRAWBACK to banking usually is the difficulty of providing simple and economical protection against faults and dangerous overloads.

GREAT increases in residential heating loads, increased use of motors which might cause flicker troubles, and rapid growth and shift in loads—these factors will give rise to many situations wherein secondary banking may prove to be the economical means of meeting the new demands.

Piedmont Installation

For testing this type of equipment, PG and E chose a built-up residential district previously served through banked-secondary transformers to a secondary grid. The area as a whole enjoys mild climate and freedom from lightning, and the practice of banking the secondaries of transformers served from the 4,160-volt primary is common there. In such districts PG and E usually limits the bank to four transformers totaling about 75 kva.

Protection has consisted simply of primary fuses, at about 1 amp. per kva. of transformer capacity. Against the economy of this scheme is the disadvantage in the event of secondary fault of having no means to prevent an extensive outage, possibly accompanied by the loss of a transformer.

The particular district selected for the test is one in which general character of the load is similar to that of surrounding residential areas. Load density above average, however, and exposure of the lines to numerous palm trees (held responsible for service interruptions over a period of years) were the factors which imposed a thorough test on the trial installation. There was the typical daily peak in the evening, amounting to about 100 kva. in the springtime, and to about 150 kva. at the seasonal peak in winter.

Prior to the new installation, the area was served by seven conventional transformers aggregating 147.5 kva. These were replaced with six 15-kva.

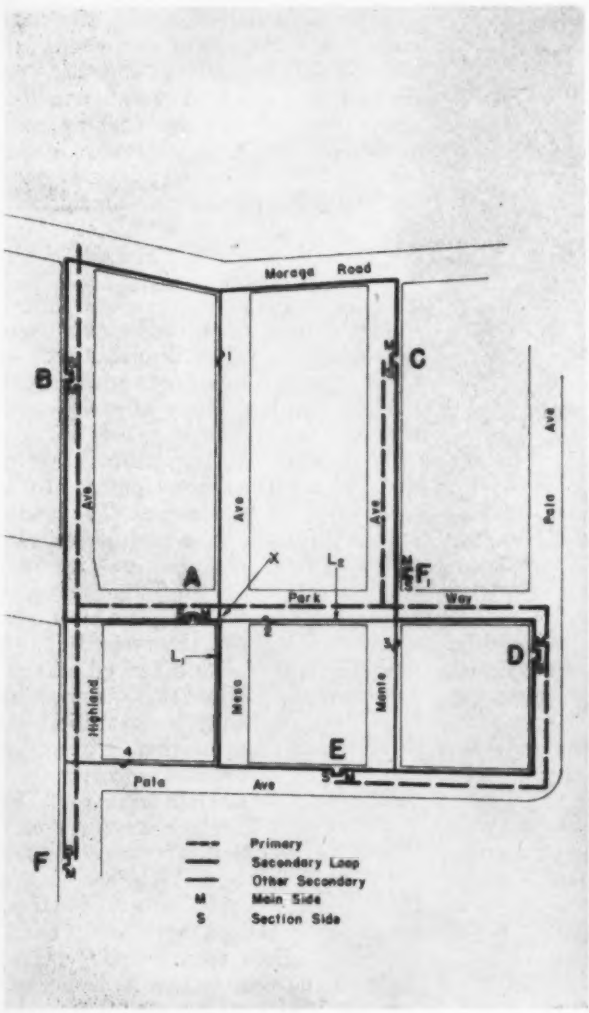


Fig. 2—Map of PG and E installation in Piedmont, Calif. Fig. 3—One transformer in installation mapped at left

special transformers, arranged as shown in Fig. 2, at locations A, B, C, D, E and F. This aggregate of 90 kva. was selected in order to provide sufficient overload for test purposes. Fig. 3 shows the character of the area served, one of the special transformers installed, and one of the trouble-causing palm trees.

Fault tests were run in April 1944, a month after installation. To permit setting up an artificial fault, provision was made at point X (Fig. 2) for connecting a secondary leg to neutral through 60 ft. of No. 4/0 wire with and without added external impedence to simulate various fault conditions.

In preliminary fault tests, the 25-amp. grid-tie fuses and a 400-amp. fuse in the fault circuit blew almost instantaneously, no breaker operation resulting.

Fusing in the fault circuit was then eliminated. Grid-tie fuses at locations 1, 2 and 4 (Fig. 2) were left open. Tests immediately following then revealed these sequences of breaker operations:

With no external impedance added to the fault circuit, transformer A section breaker tripped in 1 sec., transformer A main breaker tripped in about ½ sec. (thus clearing transformer A) and transformer E section breaker tripped in 5½ sec. (thus isolating the faulted section AE).

With 0.092 ohms added in the fault circuit and the grid still open as the result of blown fuses at locations 1, 2 and 4, fault current amounted to 850 amp. The section breaker at A tripped in 4.6 sec., the main breaker at A in 5.6 sec. (thus clearing transformer A) and the section breaker at E in 8 sec. (thus isolating the faulted section AE).

Incidentally, 24-hour recording ammeters were later used to determine currents flowing in the restored grid and showed that 12 to 20 amp. were flowing through the various grid-tie fuses.

Following installation and in subsequent months load checks were made to determine peaks. The results, obtained by a portable meter requiring 30 min. of steady load to record full load, are given in Table I.

It will be noted in Table I that prior to the February 1945 load checks transformer F was moved to location F-1 in order to relieve the loads on other transformers in the bank. The ease with which this transformer could be moved is a nice demonstration of the flexibility which is inherent in secondary banking. The extent to which it accomplished the desired result is clearly indicated by a comparison of the figures in columns 2 and 3 of Table I.

Record of Operations

Since installation, four breaker operations have occurred, three of them during the 1944-45 winter evening peak (all in the same portion of the bank) and the fourth during the following year's peak period. These are as follows:

Dec. 27, 1944: Both breakers tripped at C and D, and the section breaker tripped at B (thus isolating sections BC and BD). Secondary fuses were blown at 1, 2 and 3. Service was restored by closing the breakers. The remainder of the bank was not disturbed.

Dec. 28, 1944: Section breakers tripped at B and D. Lights were dimmed, but service was not inter-

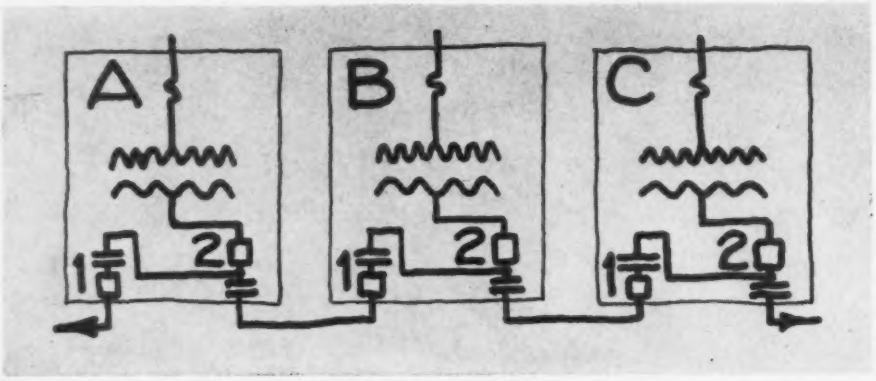


Fig. 4—New type self-protecting transformers; compare with scheme in Fig. 1

rupted. Proper service was restored by closing the breakers.

Inspections following these operations found several heavy palm leaves lying over secondary and service wires. The next operation occurred before this condition could be corrected.

Jan. 9, 1945: Identical with Dec. 27 situation.

Following this, some of the palm trees were trimmed and transformer F was moved to location F-1.

Dec. 10, 1945: Both breakers tripped at C, and the section breaker tripped at B (thus isolating section BC). Some fuses were blown. The rest of the bank was in service. Service to the isolated section was restored by closing the breakers.

Inspection the following day revealed wires pitted where they passed through a palm tree north of location 1 (above location 1 as shown in Fig. 2). Since trimming this and other trees, no further interruptions have occurred.

PG and E feels that the special transformers have demonstrated many advantages over conventional types. Tests and service have shown, particularly, that heavy short-time overloads can be carried safely, while long-time overload protection is retained. It follows that many transient secondary troubles, such as swinging faults, have probably cleared themselves before any breaker operations occurred (hence before any outage occurred). The record also shows that faults have been isolated as intended, preventing spread of the interruption or damage to transformers.

From the operating standpoint the ease with which open breakers could be located at night by means of the signal lights and the simplicity of restoring service by closing breakers were repeatedly noted. Comparison of these operations with the usual requirement of locating and replacing primary fuses, and in some instances breaking up the entire bank, indicates that outage time was much less than it would otherwise have been.

Portland Installation

Portland General Electric Co. installed a bank of four 15-kva. units of the same type in December 1943. Here again the area served is an average residential one. The bank serves 78 homes, mostly of five and six rooms, with a range saturation of 61½% and a water-heater saturation of 23%. Maximeter tests in October 1945 showed average peak load to be 150% of the rated capacity of the four transformers.

Fault tests were applied in the summer of 1944 at various locations on the secondary and in each case the breakers cleared the faulted section without interrupting other sections.

Prior to installation, the area concerned had been subject to considerable trouble from trees "shorting" the secondary wires. A solid mass of shade trees shares the parking strip with the poles in this installation. No outages due to secondary fault or overload have occurred since the installation was made.

New Developments

The banks described above were among the first to utilize this type of transformer. There are now nine such trial installations throughout the country.

This year Westinghouse has announced a further development in this special type of transformer. The breakers and bimetals have been electrically rearranged as shown in Fig. 4 in order to yield a somewhat different response to overloads and faults. The most conspicuous feature of the revised circuit is that it will isolate a faulted secondary section without disconnecting transformer capacity, an operation not possible with the original scheme, as can be seen by reference to Fig. 1.

How this is done can be seen in Fig. 4. The No. 1 breakers are those calibrated to trip first. Suppose a fault occurred in section AB. Part of this fault current would be served from transformer B and part from transformer C. Both these components of the fault current would flow through bimetal 1 of transformer B, thus assuring that breaker B-1 would trip first. Fault current would then remain flowing through both bimetals of transformer A. But in this case the currents would not be additive and, since the current through A-1 would be comparatively low because of the impedance of the secondary to the left of A, breaker A-2 would trip next, (even though calibrated higher than A-1) thus isolating the faulty section, but leaving both A and B connected to the other secondaries.

Signal lights on the modified transformers are calibrated to go on at temperatures slightly lower than those

Table I—Record of Transformer Peak Loads

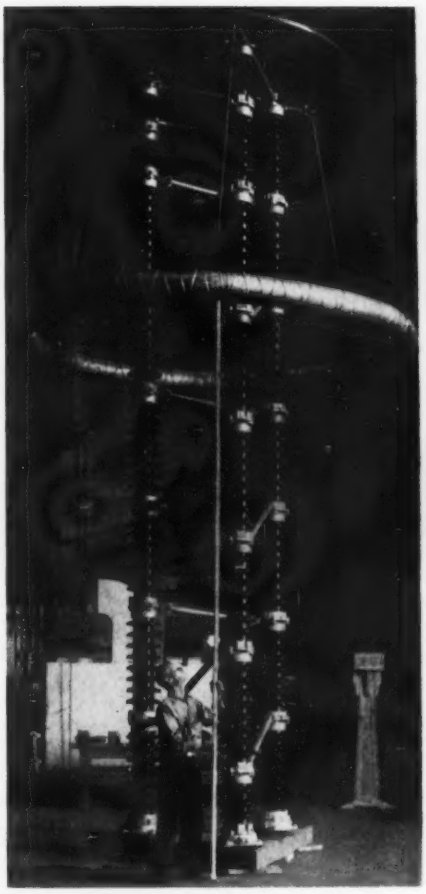
15 Kva. Transformers	April 1944 Kva.	Peak Load Per cent of Rating	Per cent Load on Two Secondary Windings	December 1944 Kva.	Peak Load Per cent of Rating	Per cent Load on Two Secondary Windings	February 1945 Kva.	Peak Load* Per cent of Rating	Per cent Load on Two Secondary Windings
A	21.8	145	(150-141)	25.9	173	(163-183)	19.4	129	(131-128)
B	24.5	163	(160-166)	29.6	197	(185-208)	25.6	171	(160-183)
C	17.3	119	(135-103)	26.9	179	(153-204)	16.9	113	(119-108)
D	19.2	129	(135-122)	28.0	187	(208-167)	20.5	137	(140-135)
E	9.1	61	(45- 77)	20.8	139	(170-108)	19.6	131	(176- 96)
F	14.9	100	(93-106)	17.6	117	(135-100)			
F_1							1.9	106	(112-100)

* Transformer F moved to new location F_1 to share increased loads on transformers A, C, and D.

which cause breaker operations. This feature (which is found in the standard CSP single-breaker transformer) gives warning that the transformer is nearing the maximum safe operating point and should prove useful in regions where loads are growing rapidly.

The new unit has been developed in ratings of from 5 to 15 kva. In the near future the range will be extended to include 25 and 37½ kva.

Cost of the extra breaker and bushings in a unit of 15 kva. rating is roughly equivalent to 2 or 3 kva. of transformer capacity. Experience to date indicates that the added breaker permits carrying peak loads of several times this amount, thus justifying the added cost even without taking into account the improvements in flexibility and continuity of service.



This lightning arrester is being built by Westinghouse for one of the 500-kv. experimental transmission lines in Ohio. Two 1½-mi. lines are to be built (Electrical West, January, page 106) in a joint project by a group of utilities and manufacturers to get data on an economical transmission design

Engineering College Notes

Washington

University of Washington looked forward to a March 4 registration of more than 12,000, 5,000 of them veterans. About 20% of the returning veterans have been registering for engineering, and an unusually large percentage of these have stated an electrical engineering preference.

To meet the critical housing shortage, quarters for 750 single men were moved to the campus from a project at Renton and 99 family units from the Hanford (atomic bomb) project. The latter are to be completely electrified.

Curriculum

In the last four years the constant revision of courses to meet special circumstances, the Navy Training Program, and the teaching experience gained by teaching government-sponsored night classes, have resulted in the accumulation of addititonal course material and new methods of presentation. Consequently the postwar curriculum for the coming fall quarter contains many changes.

The rapid technological advance made during the war points to the need for more training for engineers before they can be said to have mastered any one field. This has forced some schools to a five-year program. At Washington it is felt that there is need for men with the basic training that can be given in four years. Consequently it will continue to give the Bachelor's degree for four years of work, but with somewhat broader training than before. Advanced specialized training will be offered in the fifth year leading to a Master's degree.

The broadened four-year course now includes required courses in applied psychology, economics, business law, personnel and labor relations, and an expanded series of courses in technical composition, the humanities, and literature given by the English Department under the direction of the Engineering College. Many of these subjects have been recommended electives in the past but were in many cases freshmen orientation courses. The new courses are planned to be of sufficient difficulty and interest to stimulate advanced students.

Plans for a strong graduate school are based on the expectancy that a considerable number of students will take a fifth year of work in order to undertake the more advanced studies offered. This will be aided by a program of research scholarships for graduate students. In electrical engineering the Bonneville Administration offers several such scholarships for studies of particular interest to them.

Oregon

Reconversion found Engineering again the largest school at Oregon State College, but January registration for the college as a whole was limited by housing. Year's end saw the deactivation of the Army Specialized Training Program at Oregon State, under which 3,000 men were trained, nearly half of them in the advanced engineering phase.

New and returning students, many veterans, are finding curricular changes. Broader fundamental training and less specialized content of optional courses are the rule for the undergraduate years. Options are still available to seniors, but the highly specialized courses have been shifted into the graduate curriculum.

There are faculty changes as well. Prof. G. W. Gleeson became dean of engineering after the retirement of Dean (now Dean Emeritus) R. H. Dearborn.

In prospect, with funds already voted by the state, are two new buildings: one for electrical engineering, one for industrial research.

UCLA

Newcomer to the Western engineering colleges is the one at UCLA, where Dr. L. M. K. Boelter is dean. Busy with problems of expansion, the college started the year with two windfalls, partly to be shared by the Berkeley campus: A $15,000 research gift from Deutsch Co. of Los Angeles, and nearly $20,000 worth of instructional material obtained from the Army Air Force Training School.

Five Years of Radar

Publication of the largest series of books on physics and electrical engineering ever undertaken in this country has been arranged by the Massachusetts Institute of Technology for the Office of Scientific Research and Development, in a project to report the results of five years' wartime work on radar. McGraw-Hill Book Co. will undertake the publication, which will comprise 28 titles and a general index.

The series is expected to lay the engineering foundation for postwar industrial developments in television, communications and electronics. Manuscript is now being prepared at the rate of nearly 400 pages per day by 187 authors. The authors are principally staff members at the Radiation Laboratory at M.I.T. but others, including British scientists, are contributing.

Corrosion Plays Havoc With Coastal Meters

New studies seek means of protecting metals from troubles caused by salt air in some Western regions

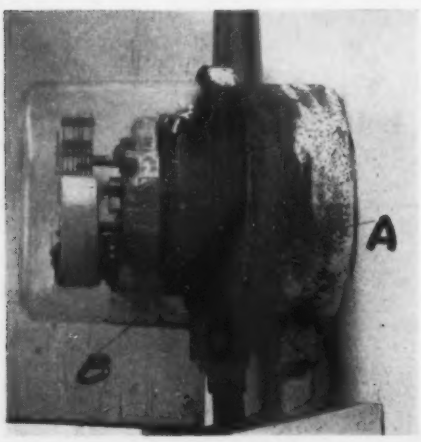
Fig. 1—Typical difficulty is this cracked glass cover. Rusting has already begun inside, extending generally over the damping magnets and edge of back plate

CORROSION of meters, to a degree such that modern equipment installed within a quarter-mile of surf may develop serious troubles within a year and a half, has been plaguing southern California metermen to an increasing extent.

Heavy fogs and salty atmosphere, prevalent in the coastal regions are apparently the conditions which give rise to corrosion in two forms: (1) direct corrosion, particularly in aluminum alloy meter bases, as a result of exposure to the damp salt atmosphere; (2) galvanic action between dissimilar metals which are in close proximity under the same atmospheric conditions.

Broken glass covers, corrosion of parts to the point where they cannot be removed, and disintegration to the point of unserviceability or to the point of presenting a maintenance hazard are among the principal difficulties.

Fig. 2— (A) Corrosion is forcing meter out of socket; (B) water inside cover



Corrosion appears to play no favorites. One manufacturer's equipment appears to be as susceptible as another's. In examining the photographs, this point should be borne in mind. The particular pieces of equipment shown are only examples of the corrosion suffered with all types.

Previous Difficulties

Corrosion of exposed metal in southern California beach areas has always been troublesome. The condition is thought to be more pronounced there because of the prevailing West winds and because the eight-month rainless season allows salt deposits to accumulate.

With the advent of A or S type meters the effects of corrosion became more pronounced. In 1940, extensive salt-spray tests were conducted by Southern California Edison Co., in an endeavor to find an effective means of coating meter bases to prevent or retard corrosive action. Manufacturers cooperated in the undertaking, furnishing numerous samples with various coatings. By 1941, although the tests were not then complete, considerable progress had been made, and manufacturers were supplying the area with meters having some type of protective finish on the base.

Then came the war and the necessity for installing meters regardless of materials or finish. This situation, the accumulated results of maintenance problems encountered throughout the war, and the fact that the modern Type A or Type S meters appear to corrode more rapidly than the older types have again brought the problem into prominence.

New Tests

Now, studies of corrosion protection are continuing. Two means are employed to determine the response of various equipment to corrosive conditions. One is the exposure in a salt-spray booth; this provides an accelerated test but does not accurately reproduce service conditions. The other is a test rack at Redondo beach, where the samples are exposed to the daily cycle of service conditions—salt spray with cool damp nights; hot sunshine during the middle of the day. In both cases, however, tests are run on complete meters.

When it was discovered that corrosion was so severe as to force an S-type meter out of its socket, often with the flange of the socket accompanying the meter, thus requiring replacement of the socket as well, Edison began to favor A-type meters for installation in the beach areas. For this reason, recent tests have dealt with A-type meters. In general, however, it has been noted that both types of meter suffer to about the same extent.

Extensive study of the various difficulties accompanying corrosion has permitted forming some general observations.

It has been noted that selection of a recessed or protected location for making the meter installation is of very

Fig. 3—Shows susceptibility of aluminum; sealing ear and screw are unusable

Fig. 4—Seals, screws and covers corroding on adapter, terminal chamber

Fig. 5—(A) galvanic action at rivets; (B) casting broken; (C) screws sheared

little help. Anywhere in the beach area, small amounts of salt-laden atmosphere are likely to find their way to the meter, and even small amounts can do extensive damage.

Unpainted meter bases are most susceptible to corrosion. But the actual added useful service which results from painting the base is yet to be determined.

Areas within a quarter-mile of the surf are the worst. Here, modern meters may deteriorate in 1½ to 5 years to a point where removal of the meter cover is both difficult and a hazard to maintenance men.

Where the cover ring is of a different metal than the socket or base, galvanic action will in a short time make it impossible to remove the meter cover.

Pressure of the salts formed by corrosion often crack the meter cover, giving rise to damage which either requires extensive repair or makes repair uneconomical. This too may happen within 1½ to 5 years.

Galvanic action occurs wherever brass screws are in contact with the aluminum alloy base; this soon results in the screw's shearing off when an attempt is made to remove it. When a meter is moved from one location to another, the shearing of either terminal chamber cover screw necessitates shop repair of the meter.

On A-type meters, die-cast aluminum adapters of company design (installed below the meter) have proved subject both to direct corrosion and to galvanic action through two small nickel-plated brass sealing screws.

Service units sold to customers to house indoor meters and overload breakers deteriorate so that neither breaker nor meter compartment can be opened except by force; corrosion frequently extends to the seals, thus defeating the purpose of sealing.

Best Solution

In tests conducted so far, an A-base meter with all exposed metal of aluminum, anodized by the sulphuric acid process and then coated with air-dry lacquer has stood up best. Such units have stood 115 hours in the salt spray booth, then 264 more hours standing wet, or have stood up four months on the test rack, without any evidence of corrosion.

Both Edison company and meter manufacturers are continuing their studies. Among samples to be submitted by the latter will be socket meters with base plates, cover ring and sealing band of stainless steel.

● THOSE who are closely following radar will want to send 15 cents to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for a copy of *Electronics Warfare — A Report on Radar Countermeasures*. It has been released by the Joint Board on Scientific Information Policy for the Army, Navy and Offices of Scientific Research and Development.

● RADAR ON WINGS is a beautifully illustrated 32-page booklet being sent to all Philco stockholders, distributors and dealers. Philco makes no promises about distribution, but if you wish to see excellent installation photographs and pictures of German terrain, as displayed on airplane oscilloscopes, try writing Philco Corp., Philadelphia 34.

● CHINA's plans to industrialize include an initial expenditure in the United States of $85,000,000 for electrical power equipment and associated items. Those interested in doing business in China can obtain specific information by writing the China American Council of Commerce and Industry, Inc., 303 United States National Bank Bldg., Portland 4, Ore.

● WESTINGHOUSE says that its Sharon works now make it standard procedure to apply surge tests to all transformers regardless of size. The test is applied before the transformer goes off the production line by means of a 3,600,000-volt surge generator delivering an impulse with a wave front arranged to simulate mine conditions.

● TURBINE-GENERATOR backlog of General Electric Co. exceeds $30,000,000, and G-E estimates its rate of steam turbine production in the next few years will be twice the prewar average.

● FIVE NEW STANDARDS for power circuit breakers, approved last year by the American Standards Assn., are now available in one volume (P37.4—1945 through P37.9—1945) at $1.25.

● SOUTHERN CALIFORNIA TELEPHONE Co. has an application on file with the FCC for permission to construct facilities to provide urban mobile radiotelephone service for Los Angeles.

Lessons from Federal Housing Practice

Experience with a variety of designs used in furnishing electricity to Western projects shows what cost-cutting schemes pay out in the long run

Scott Beamer and Ralph A. MacIntyre

OUT of the great prewar and wartime housing projects comes a variety of experience which indicates what goes to make up good electrical design. For the benefit of electrical men who will soon be concerned with the design, installation and maintenance of postwar housing—both private and public projects—this experience is set forth as a series of practical lessons.

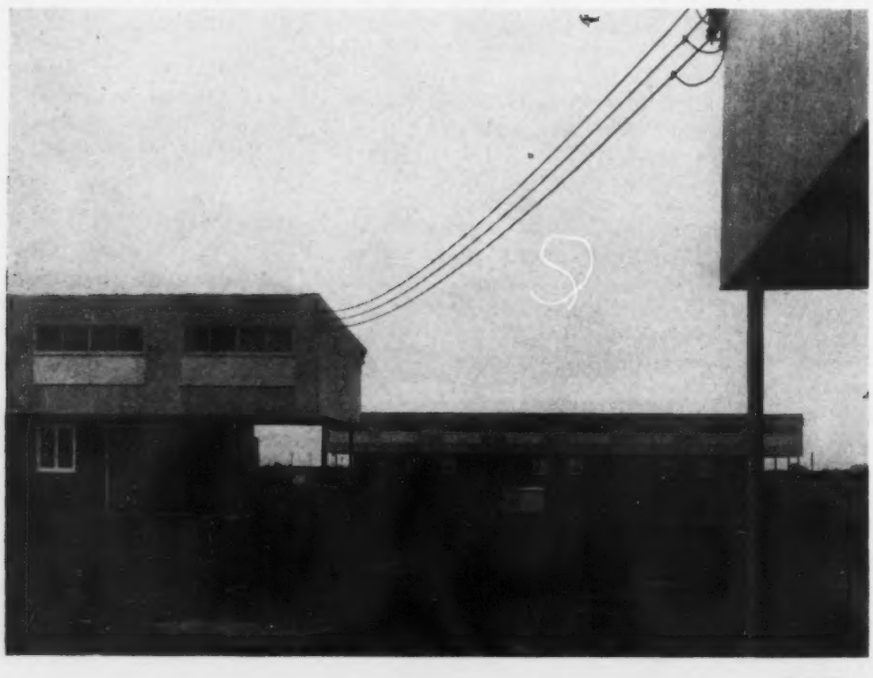
Background

In the prewar period beginning in 1936, the Farm Security Administration, Region IX, spent some $5,000,000 in low-cost rural housing projects. It was during this period that FSA set to work on the farm labor camps to accommodate the migratory agricultural workers who had been pouring into California. Within this period itself, experience was a teacher, with the result that each camp was built better than the one before. The later camps were modern, streamlined projects.

In 1940-42, the program of national defense brought about an acute shortage of housing for workers who came West to work in the war industries. FSA spent another $3,500,000 on emergency housing. It consisted of home units, apartments, dormitories and even trailer camps.

Today, the farm labor camps are still full, and the emergency housing projects adjacent to aircraft plants and shipyards are 30% full. It is now nine and a half years since these various types of housing had their beginnings, and it is from experience throughout this period that the following lessons are deduced. A variety of individuals have helped to make this information available. These men include Harry M. Donaldson, district engineer of the Department of Agriculture's Production and Marketing Administration—Labor Branch, and Austin Moore, James D. Richardson, William Bennett, Ralph Harrison, Oscar Mundell, S. E. Hutchinson, George Fitscham, Harry Barnhill and John L. Elliott, all electrical men representing the Federal Public Housing Administration.

Firebaugh labor camp, a typical modern project. Bracket construction for service wires and flood lighting (units mounted under overhand) proved worthwhile



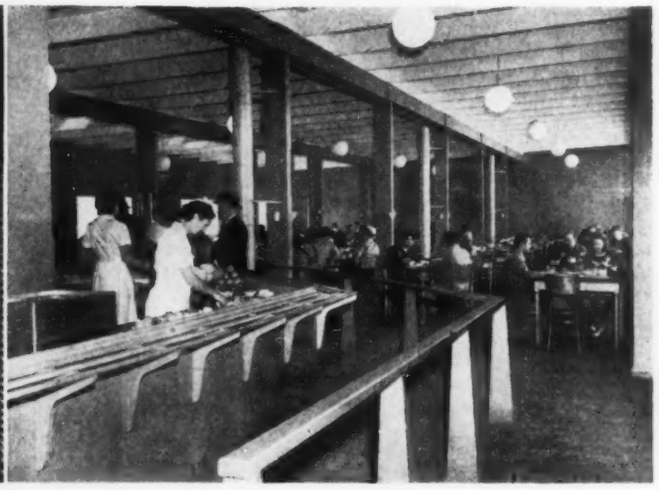
Overhead Lines

Although estimates of demand and peak load on the early camps were usually good, too much copper was often used. These distribution systems were designed for 2 to 3% voltage drop in the overhead lines (reactance also being considered), but they were often hooked to a rural power line with a much greater percentage regulation. This overuse of copper was later prevented by visiting the local offices of the power company concerned, and then correlating the design of the distribution system with conditions in that area.

In the early camps insufficient collaboration with the landscape architects resulted in having rows of sturdy, fast-growing trees directly under the pole lines. Two pole lines have had to be moved. In the later camps the landscape architect was consulted at the time the plans were being prepared or altered.

Two new maintenance problems have recently cropped up. Poles too near parking areas or paved surfaces have been hit by defense workers' vehicles: 6-ft. clearance between the pole (or down guy) and the paved surface should be a minimum. The second problem has occurred where deep drainage ditches were recently dug alongside poles or down guys. Both designers and later project managers will have to watch for this.

Maintenance and operating experience has shown the necessity for a main-service disconnecting switch where the power company's overhead lines connect to the project's overhead lines. In 120/240-volt services, a pole-mounted, rain-tight multibreaker, or rain-tight-fused, externally operated safety switch is desired. Four hundred and eighty volts or higher would best be controlled by a pole-top oil switch or cutouts. These main service disconnecting switches are seldom needed but, when they are, they are worth their weight in gold. In view of maintenance alone, sectionalizing switches (cutouts) have been desirable in the large camps. This has been carried out recently in several camps.



Examples from the FSA defense housing site at San Diego demonstrate how appropriate selection of lighting units provided good lighting while keeping within the over-all construction plan. Cafeteria (right) used exposed wiring

Limited budgets usually call for just 25- or 30-ft., class 6 poles. Experience has shown all along that 35-ft., class 5 is a minimum for overhead distribution lines.

The system of putting individual switches on each street light or protective flood lighting unit is uneconomical. For some reason, many lights just get left on. A single switch in or near the manager's office will insure a saving in power. Astronomical time clocks have also been successfully employed.

When designing a pole line, and in doubt about using one down guy or two—*use two.* Even though the FSA used many guys in their camps, almost every camp could use one or more additional down guys.

One clever stunt used by F. C. Bragg of the Vallejo Light and Power Co. was to take off a down guy from each level of lines on a pole (i.e., one guy from the telephone line level, one from the secondary level, and one from the primary level). This will prevent the pole from twisting or bending in use.

FSA maintenance experience has shown the desirability of a maintenance crew to check each new pole line installation one year after it is built. Several poles will need retamping, and the guys can usually be tightened up to put the needed rake back into the pole. The lines should not be piano-wire tight, but have the sag recommended by the California Railroad Commission Overhead Line Construction Handbook, General Order 95.

Interior Wiring

In the climate of the Imperial Valley and Desert areas, the normally rated 440-volt motor starters do not have a long operating line, especially when they have the heavy duty of controlling the motors for pumping water and sewage for the camps. As is common in that area, most electrical men use the next larger size of heater elements in the thermal overload relays because of the high ambient temperatures. In the heat, alkalyne dust and climatic conditions, especially around sewer and water pumps, it has been found desirable to use the next size larger motor starters. It appears the insulation of these starters otherwise gives out.

In the rural or farm installations, the replaceable link fuses have proven to be a costly substitute for the multibreakers. Both the type MO and MB multibreakers have held up very well under all climatic conditions, except very close to salt water. All the experienced electrical men know what happens to replaceable link fuses.

In designing the electrical installation for a deep-well pump or a sewer pump, there is a great temptation to run the conduit from the starter to the motor either under the ground or in the slab. In the five to nine years' experience in the farm labor camps, some of the conduits have rusted out and have caused a shut down. In these conditions it appears best to run the conduit overhead from the starter to the motor. It is necessary to check the bonding and grounding on these installations to afford the greatest possible safety to the operating personnel. (Wood platforms over the slab in front of the switches or controls give added protection on 440 volts or higher.)

In the installation of the sewer pump-

Farm labor homes grew more efficient as to over-all design, efficiency and electrical service as experience was gained. Winters homes illustrate the best

ing units, some trouble has been experienced with light-duty float switches and/or alternator devices. They have had to be replaced in three or four years after they were installed.

Pressure switches were installed at the base of certain water towers to maintain the proper water level. They required so much service that they were eventually taken out. Water-tight heavy-duty float switches with chain leading to the float were installed inside the tower and have given good service.

In the wash houses (utility buildings) thin wall conduit gave better service than BX, but rigid conduit has been even better considering the mechanical abuse it had to take. The thin wall was used for athletic bars, laundry racks, etc. The steel tube did not rust even under these conditions. Experience indicates rigid conduit should be used for exposing wiring subjected to any abuse or rough usage.

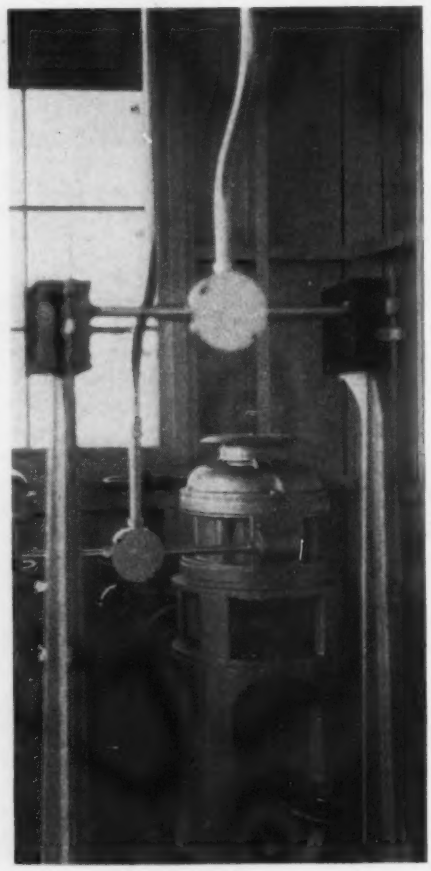
In the farm labor camps and in the defense housing it was thought that the porcelain pull receptacle would be a substantial economy over some other fixture and a wall switch. In the public housing, the saving has most likely been lost in added power consumption. Most persons have been taught to "turn off the switch when walking out of the door." People just don't "walk back to the pull-chain." In a large camp replacing pull-chain receptacles takes lots of time.

All lighting fixtures require very careful selection. One recent experience surrounds a shallow domed fixture; the shallow glass dome fits onto a metal pan which is fitted flush to the ceiling. The ceilings were made of a pressed fibrous insulating material. The 10-in. fixture held two 60-watt lamps and the 12-in. held three 60-watt lamps. In the larger fixture each lamp almost touched the socket of the next lamp around. Because of the nearness of the lamps to the sockets and the lack of ventilation in the fixture and the insulation provided by the wall board, the ceiling above the fixture was charred and the rubber insulation baked off the fixture wires. One USHA maintenance man has notched the rim of the fixtures in his project to allow some ventilation. He says the ventilation has helped a lot. The 10-in. size has given no trouble.

Proven Practices

1. The use of "Specification Grade" materials in public housing has been well worth the cost. On the 40 FSA projects, there have been almost no switch or convenience receptacle replacements. There has been only one transformer replacement, no rewinds, and no known insulator replacements. Inspections and surveys have shown that the public has given these projects very heavy usage. Only the best in materials and workmanship will hold up.

2. Unlimited public use of electricity in camps and projects requires in reality an oversized distribution system. In the early camps, circuit protection devices were the only current limiting factors. In the later farm labor camps and in the trailer camps, small thermal overload switches were used on each of the units and on the load side of the



Service to this pumping unit at Firebaugh illustrates some of the lessons learned from earlier, less satisfactory installations. Among them: use overhead conduit from the starter to the motor, provide reliable bonds and grounds. Underground or in-the-slab conduits very frequently rusted out

circuit protection. These proved to be very satisfactory insofar as they give an equitable distribution of the power to each of the users and allow for much smaller transformers and overhead lines. It is obvious that the covers of the current-limiting switches must be soldered or welded on.

Recent recording ammeter tests show that the average farm labor family in a four-room apartment will use a peak of 500 watts/family with 50 or more families on the line. When electricity is included in the rent, certain abuses are almost certain to occur. Limiting current to consumers becomes an interesting and controversial subject. When electricity is provided the amount used by a family is more or less independent of the financial status.

3. Adequate street lighting and adequate protective flood lighting have been well worth the cost. Some federal projects had such limited budgets that street lighting and protective flood lighting had to be left off the contract. In several of these projects street lighting and protective flood lighting had to be installed at a later date, in order to render the project operable. FSA has installed such lighting in all camps and projects since its inception. These expenditures have never been regretted.

4. It is the feeling of several of the USHA and FSA officials that the adequate wiring and lighting is well worth its cost in view of increased morale, the functional efficiency, and the added safety to all concerned.

5. The USHA and FSA maintenance men point out that overhead lines larger than No. 4 which have been dead-ended with double Kearney connectors have never slipped or given away to date; the service drops which end on racks have maintained a perfect score. All red cedar poles with the creosoted butts have a perfect score, whereas the untreated poles are beginning to rot around the ground line.

6. In the later camps and in all projects in almost all steaming or wet or exposed locations, rainproof or vapor-proof fixtures have been used with much lower maintenance.

Some Conclusions

The following are some conclusions drawn by the author. They appear to be borne out by experience and should apply to future housing.

1. Use "Specification Grade" materials.

2. Build it strong.

3. Limit the load to families or units by individual metering or by current limiting devices (not by circuit protection alone).

4. Use oversized motor controls in damp or severe climatic conditions but always use the proper size thermal overload relay. (Place switches, multibreakers, etc., inside wherever expedient.)

5. Favor multibreakers over fuses, where possible, for both motors and lighting.

6. Use vapor-proof or raintight lighting fixtures in damp or wet locations. Don't put glass fixtures in places where they may get broken.

7. Use plenty of bonding and install good grounds.

8. Make the pole lines heavy and strong, use plenty of down guys and watch ground bearing pressure at pole butts.

Let the Code Decide

Third of a series on this subject by *James Moore Evans*

HERE is a knife that cuts both ways; a four wheel drive with full speed reverse.

To "let the Code decide" means that the Code must adequately regulate every product and material in its field and yet not be so restrictive that its provisions seem unjust.

The Code needs to be so broadly adequate and yet so generally restrictive that the work required by the wonderful, weathertight, insulated houses of Boston is competently provided for and the flimsy open-air houses of southern Florida do not have work that is patently "gold plated."

People who must stay within walls for long evening hours and sometimes days need many conveniences to encourage efficient use of the time.

But the ones who are out hunting or enjoying open-air games or sitting on the lawn practically every evening of the year need only a small percentage of the indoor conveniences and many more of the special lighting fixtures, insect traps, and other outdoor devices.

The family in the cold climate resents being forced to supply its home with provisions for the use of outdoor gadgets and the southern cousin resents being required to wire the inside for the gadgets the long, confining hours make advantageous.

"Let the Code Decide"—indeed that is the perfect slogan — but the Code cannot decide unless it regulates all materials and methods of installation and is only generally and broadly restrictive.

It cannot decide unless everyone feels that it is openly just and fair. The southerner must not feel that he is forced to spend a hundred dollars per shack extra on non-essentials.

I know the adequacy I want—don't you? If we do not, we will hire an architect or engineer to tell us.

The Code and enforcement ordinances should set up minimum requirements for safety to life and property. When work is installed as specified by the Code, there should be no chance for anyone to get hurt. The same thing applies to property.

When wiring is installed as specified by the Code, there should be no chance for a fire to originate in such work.

Electricity is energy and in time it causes deterioration of the installation. It is possible to build for five years, a lifetime, or 100 years, but the practical life, when the work has not been molested should be that of the building in which it is installed, and every portion of the wiring, "including the weakest link," must be designed and installed for this life.

The practical manufacturing set-up requires that only one quality be produced in each factory. This should be set by the Code. Therefore, there are two points where inspection is required: one is in the factory during production; the other is on the job during installation.

In each place, the broad general regulations of a minimum safe code should be the governing influence, and these regulations should be enforced by inspection service. "Let the Code Decide."

NAWB Mailing Pieces

To boost the wiring modernization campaign, the National Adequate Wiring Bureau has ready four new direct mail pieces. Each is designed to awaken consumer interest and urge immediate consultation with an electrical contractor. Subjects are: "Spend Less Time in your Kitchen and Laundry," "Modernizing Your Home?", "Beauty, Comfort and Livability in Every Room," and "Check Your Wiring." The latter is a layman's digest of the National Standard, running 16 pages. Prices are 90c per 100 for each of the first three, $1.70 per 100 for the last, all prices slightly lower in quantities exceeding 5,000. The bureau is at 155 E. 44th St., N. Y. 17.

Lighting Movie

A first-class sound-color movie tops an array of store-lighting promotional material under the slogan "Seeing Is the Biggest Thing in Selling—and Lighting Is the Biggest Thing in Seeing"—slogan and all being pitched through utilities and distributors toward the commercial market by the Lamp Department, General Electric Co.

Color, and a character named Seymour, animate both the motion picture and the printed sales material. Intensive research as to what lighting can do for a store and how it can be most efficiently used are thus put across with a punch.

This is a phase of G-E Lamp's sales instructional program, arranged for use in class or group training programs for commercial lighting salesmen. Prices and ordering information are available in a folder (1946 Store Lighting Sales Builders).

W. H. Robinson of G-E Lamp launched the "Seeing Is the Biggest Thing in Selling" program on a West Coast swing which brought him before utility and wholesale groups in San Francisco, Spokane, Seattle, Portland, Los Angeles, Salt Lake City, and Denver.

Salvage

Bare and weatherproof wire

SALVAGE, a process brought into unusual prominence during the war, will continue as a standard procedure wherever it pays dividends. Here are some notes on the reclaiming of wire. The information is from a paper by R. E. Fritzer, San Diego Gas & Electric Co., presented to the Purchasing and Stores Section, Pacific Coast Electrical Assn.

Scrap wire (bare, weatherproof and rubber covered) is divided into three classes:

1. That which is of no possible use. This is burned, baled and sold as No. 1 copper.

2. No. 4 and 6 bare solid wire that is in good condition. This is saved until 500 to 600 lb. are on hand; then it is sent to a plant for annealing at a cost of about $0.0175 per lb. The annealed product is used for making bare tie wires and for bonding.

3. Pieces of new or good wire are too short to use as is, but too good to junk. Very short pieces of No. 6 WP are used to make weatherproof tie wires. The balance is accumulated until about a ton is on hand; it is then spliced into usable lengths.

The following are sample costs for reclaiming No. 6 and 8 WP:

1,660 lb. WP scrap	@	.05	$83.00
150 No. 8 ABC sleeves	@	.07	10.50
67 No. 6 ABC sleeves	@	.14	9.38
9 No. 8 H&S sleeves	@	.05	.45
4 rolls P&B tape	@	.26	1.04
50 hours labor (lineman)	@	1.32	66.00
50 hours labor (groundman)	@	.98	49.00
Total Cost			**$219.37**
1,010 lb. No. 8 WP solid copper wire	@	.1765	$178.27
650 lb. No. 6 WP solid copper wire	@	.1692	109.98
Total Salvage			**$288.25**
Profit			**$ 68.88**

● THE BUCKEYE PROCESS of cleaning, dehydrating, degasifying and stabilizing oils is lucidly described in a well prepared bulletin which may be obtained by writing the Buckeye Laboratory Corp., attention R. H. Webster, at 7016 Euclid Ave., Cleveland 3, Ohio.

Desk—The Design Target in Private Office Lighting

Symmetrical luminaire arrangement sometimes stands in the way of getting best results at the critical areas

A. W. Larson

Lighting Engineer
Westinghouse Electric Corp.

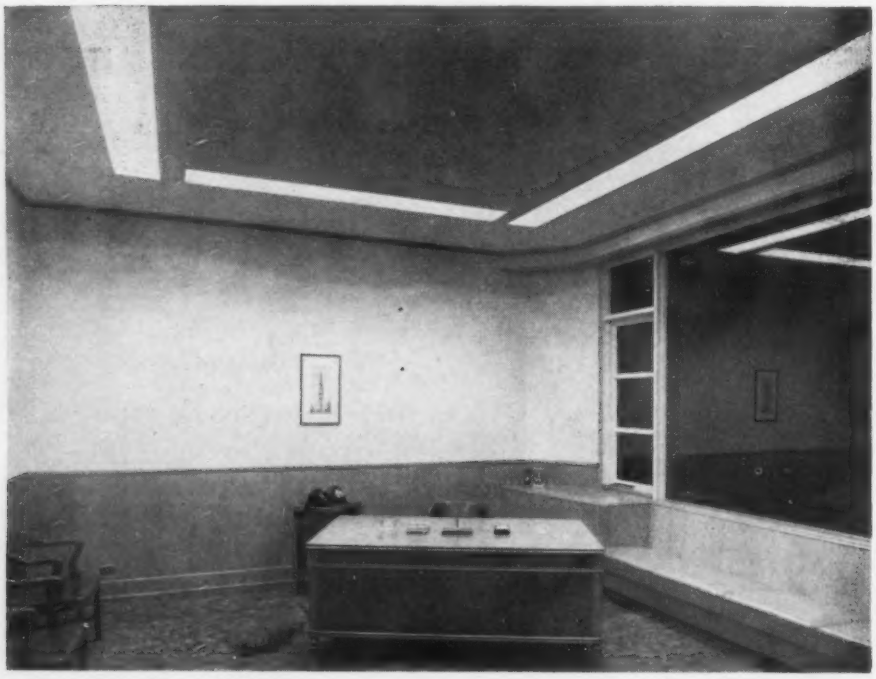
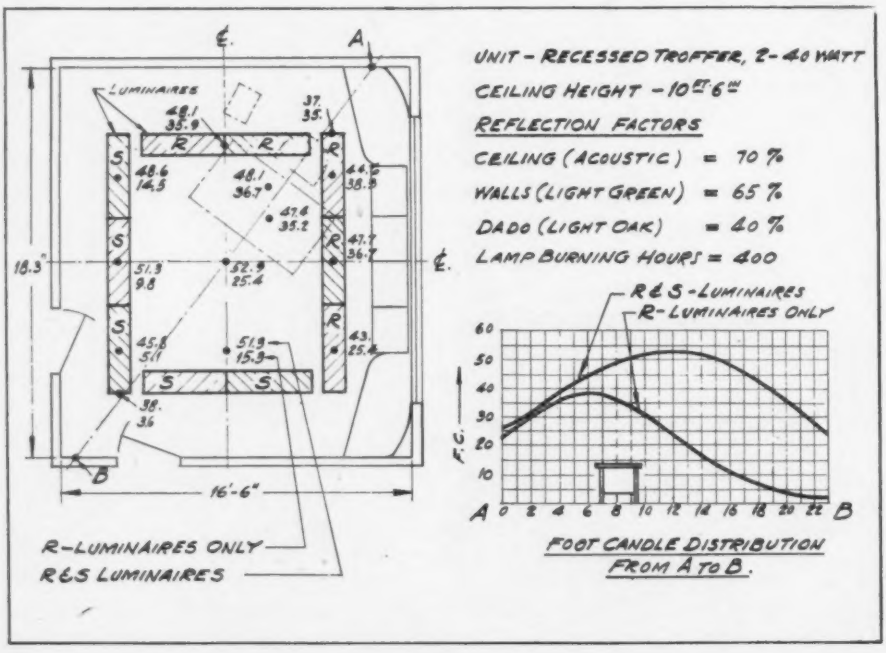


Fig. 1

Fig. 2



FOR years the design of lighting for private offices has baffled lighting engineers, while the lighting for general offices seemed relatively simple. Now, with a new technique, the reverse applies. By enginering the layout of the luminaires with respect to the desk and table, the ideal in quantity and quality of illumination may be provided with standard fluorescent luminaires.

The new method may be termed "Functional Lighting" or "Specific Lighting," since its purpose is to provide seeing comfort for the person working at the desk or table. Among other things, the method discards the notion that private office lighting must be symmetrical, even though nothing else in the office is symmetrical.

There are three main reasons why private office lighting is difficult:

1. The installation efficiency (utilization coefficient) is low because of the small area. This means it is often impossible to make a symmetrical layout that will provide the desired level of illumination without a "fixture store" appearance, or excessive wattage and heat.

2. The lumen method of calculation determines the average illumination only and therefore does not give the expected intensity on the desk or table which is of most importance.

3. If a symmetrical layout can be made to satisfy appearance and average foot-candle requirements, the cost is often deemed prohibitive. The cost per foot-candle per square foot is higher than for a larger general office because of the lower installation efficiency.

Private office lighting has one advantage from the standpoint of luminaire location, and that is the demand for flexibility in locating the desk or table is not as important as for a general office. Usually there are only a few practical positions where the desk and table can be placed. It is important, however, that they be located to utilize natural light from the windows to best advantage.

From a quality standpoint, private office lighting techniques commonly used today, have certain disadvantages. The single-fixture installation is often so located that the brightness of the fixture is reflected from the desk top, paper, pencil-writing and instruments commonly used in offices. Pictures or glass partitions can also be a source of reflected glare with critical locations of luminaires. Even if the luminaires are symmetrically spaced to provide a desirable intensity, reflected glare invariably results, whether working at the desk or table. The requirements then are to eliminate reflected glare by locating the luminaires around but not

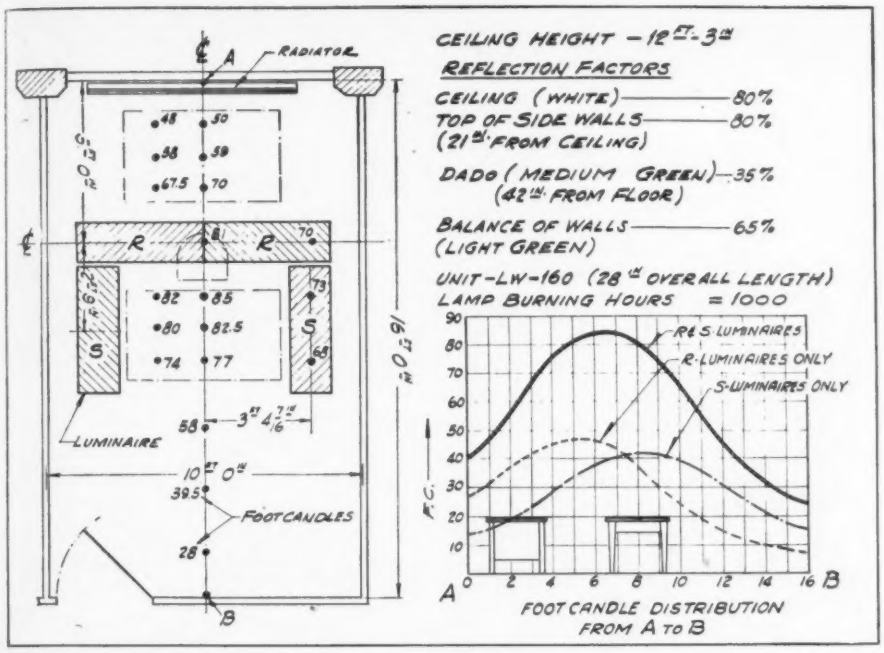


Fig. 3

in front of the person working at the desk or table. Specular images of the luminaire brightness then are reflected away from the eyes of the person sitting at the desk.

For the office shown in Fig. 3, four 4-lamp, 40-watt fluorescent luminaires installed symmetrically (not as shown) would provide an average level of 38 ft.-candles in service and approximately 63 ft.-candles initially. With these same four fixtures installed as shown in Fig. 3, the illumination varies as indicated by the "foot-candle distribution" curves from A to B. The curves illustrate clearly that the abundance of light is on the table and desk and that the person working at the table (which seems to be a most common occurrence) works under a high intensity and looks into a low graduated intensity when looking across the room in front of himself. By measurement of this installation, brightness contrast was well within good design, and by observation, no harsh brightness existed in the form of either reflected or direct glare as viewed within normal viewing angles.

After 1,000 hours of burning, the average illumination from A to B was 57 ft.-candles. This compares favorably with the calculated initial average level of 63 ft.-candles; the intensity at the table was 85 ft.-candles, even after 1,000 hours of burning. This exceeds the average by 49%, which is acceptable since the brightness contrast of the surroundings is well within accepted practice. The brightness of the walls is more important than the foot-candles on the horizontal plane between the table and the wall.

Many designs to accomplish the same results can be made, the choice depending upon the shape of the room and possible desk locations. Figs. 1 and 2 illustrate application of the same method to another office.

Lighting Exposition

Opening in Chicago, April 25, the International Lighting Exposition is scheduled to present a dress parade of what's new in lighting and an exceptional program of authorities in all phases of lighting, from engineering the source to final sale. NEMA's Industrial and Commercial Lighting Equipment Section is the sponsor.

The Exposition, at Stevens Hotel, will get underway with a preview for electrical wholesalers from noon to 6 p. m., April 25. Next day at 9:30, forums get under way. Seventy exhibitors will be represented. Attendance is expected to exceed 10,000. This and the general hotel situation has led General Chairman E. C. Huerkamp to warn prospective visitors not to delay making reservations. Exposition manager is A. B. Coffman, 111 W. Jackson Blvd., Chicago.

Signs of Progress

Three times as many electric signs were erected in Vancouver, B. C., in 1945 than during 1944, according to the city's electrical department. The total was 207. Predicted for 1946 is a fourfold increase in demand for ornamental lighting. Footnote to the report: relamping of street lights required 10,000 lamps.

F Light for Gardners

Using ordinary 30- and 40-watt fluorescent lamps as the source of light, home gardeners who do not have access to greenhouses can now propagate cuttings and seedlings in their own basements or storage rooms in an enclosed unit developed by the U. S. Department of Agriculture.

A unit 6 ft. long, 3 ft. high and 3 ft. wide for use with a fixture containing two 40-watt fluorescent tubes is suggested. "Fluorescent strips" as the source of light may be used instead of the two 40-watt tubes. If the unit is to be carried through doors or houses, the width may be 2 ft. with only one tube. Two doors hinged at the top are provided for the front of the unit. Ventilation is unnecessary. Construction of waterproof composition board is suggested, especially if insulation is important.

The unit, as designed and tested at the Plant Introduction Garden, Glenn Dal, Md., has (1) a heated or warm air space below, (2) the rooting medium in a flat or trays with drainage, (3) fluorescent lamps and reflecting surface, and (4) an air space above the lamps to prevent excessive heating. Relatively little watering of the rooting medium is necessary but generous watering has not proved harmful. Temperatures of from 72° to 75° are ideal for many cuttings.

The tubes should be from 12 to 15 in. above the rooting medium. Although quicker rooting may be obtained under 16-hour light periods with some species, continuous illumination is simple and generally satisfactory.

A light rich in orange-red rays produces the most rapid and heavy rooting of cuttings. Either a 3,500° white or a pink fluorescent tube is therefore preferable to a daylight tube, though reasonably good rootings may be expected with the latter. A light richer in the blue-violet rays is recommended for use in growing seedlings, as the light most favorable for cuttings produces a rapid but leggy, spindly growth of seedlings.

● Ace Electric Co., 1336 Van Ness Ave., San Francisco, is a new firm specializing in fluorescent lighting. Advertising a year's guarantee and complete stocks of all fixtures for immediate delivery, the company does its own installation work and electrical contracting as well.

● See for Yourself is the title of the national Better Light-Better Sight Bureau's first postwar sound slide production. It is intended for showing at all kinds of community groups, has a running time of 15 minutes, is offered for $30.

Charles Rogers' Modern Appliance Co., left; Dwight McCormack talks Electromaster to a customer. Conlon exhibit

Tho' Buyers Flock—Yet There's No Stock

ON the mark, all set, but no gun to signal "go." Something had pulled the cartridge from the gun. Strikes! Such was the oddest market week ever known in the long history of twice-a-year markets for the home furnishings industry at Western Merchandise Mart, San Francisco, this year, Feb. 4-9.

Three times as many dealers jammed the building opening day and twice as many attended the entire week as had ever attended. All were eager both to see the new merchandise and to buy. Frantic manufacturers' representatives and distributors pleaded with, wheedled, coaxed, even cursed their factories and the transportation lines to get samples out in time for the market. There were some rather complete exhibits, but most of them had to content themselves with life-sized cutouts, catalogues and literature or dummies (radio cabinets without innards, for instance).

It was a fantastic week. By Wednesday most of the poor bedeviled distributors were hoarse from saying "no" and pleading for patience. Many wished they had phonograph records to repeat the excuses they had to recite, each time with a broken heart, to eager dealers.

Toughest was to tell so many men still in uniform who came hoping to line up franchises for dealerships that there were already more dealers than their home towns could support. Never before have so many tried to do so much with so little.

From these impressions let it not be taken that the market failed in its purpose. If not in products, then in by-products was it very worthwhile to those who flocked to it from all of the West, even from Montana, Idaho, Utah, Arizona, Colorado, as well as the nearer states. It served a much needed purpose of reorientation.

So many changes have taken place. So many have changed affiliations. There are so many new people to become acquainted with, new companies to learn about, new lines promised. Nothing but a big get-together like the Market Week could accomplish this. It was worth the travel trouble, the expense, the time and even the disappointments.

There were a few very new things, such as Thor's Automagic combination dishwasher and clothes washer. Both it and the clever conversion of Thor's table model portable ironer to a folding stand type of ironer, were demonstrated constantly by Thor Pacific's branch manager Don B. Lennard and staff, working in relays.

Something else very new was a panel type portable electric heater of 1,000 watts, consisting of two tough glass plates on which had been affixed a metal strip in a grid pattern. It operated at black heat, was ETL tested, made in a portable stand 15x20 in., weighed 20 lb. and was priced at $29.95, made by Radiant Heater Corp., New York City, and distributed by Rudiger-Lang Co. of Berkeley.

Left: Westinghouse set each appliance in its own kitchen. Center: John Southmayd puts the Thor through its Automagic of dish and clothes washing. Right: Farnsworth television with Sutton, Rogers, Cook, Merle, Sanders

Hoffman Radio was new, too, with a rather complete line on display. This Los Angeles manufacturer was early in reconversion. Walter Epstein, who once headed the Emporium's radio department, has the northern California distribution.

Some of the eagerly awaited newcomers were unfortunate in not being able to show samples as yet, among them Admiral, Jacobs Launderall, Monitor, Lear radio with wire recording, Chapman refrigerator and freezer; nor was Presteline or Avco represented with any of their promised new lines.

Both Zenith and RCA-Victor presented new principle phonograph record pickups in their new models, the Zenith at H. R. Basford display and RCA at Leo J. Meyberg. Fancy glamor names they both have too—Cobra arm on the Zenith; Golden Throat on RCA. Although Philco had a very lightweight pickup arm, there was noticeably absent its photocell pickup of before Pearl Harbor. Thompson-Holmes showed the Philco line. Philco sprung its trick portable radio-phonograph. Just push in the record and it automatically does the rest, like a popup toaster. Farnsworth had the only television receiver on display, at the Frank Edwards Co. space. It was a table model, such as has been sold in television areas prior to the war. None of the radios had FM, probably because the matter of wave band allocation had not been settled when these models were made for the market.

So much for the products. Accompanying pictures show how nicely many of the manufacturers and distributors displayed what they had on hand. Those who could take orders were swamped with them. As a sort of consolation side show, the giftwares and toys people were holding a big market week too, spread over the Civic Auditorium, Whitcomb and St. Francis hotels, and there were enough gadgets, gifties, what-nots and bric-a-brac available right now to fill up empty shelves for many visiting dealers.

The most valuable by-product of the market, of course, was personal contact, renewal of old acquaintance, learning the new people and finding out where many of the old timers now affiliate. The appliance business is always fluid. There are always changes.

For instance, John N. Barker, before the war with Westinghouse, then after war agency work returned to Westing-

Kelvinator's C. J. Bachman and Fred Fowler of Portland with Leo Kass and Phyllis VanHouten of PG and E, at top. N. B. Dinkel, Crosley manager, center, shows new kitchen to the Millers. Bottom: A Bendix corner at Meyberg's

house Supply, now is regional merchandiser of gas and electric appliances for Montgomery Ward. He was around visiting. Leroy Bennett and O. B. Wilt, both former G-E distributor men, are the Monitor distributors for northern California. Unfortunately their samples came too late, except for a cute little portable washing machine. Bill Miles, also formerly of Westinghouse, was in the Stromberg-Carlson space in the radio division.

N. B. Dinkel, regional manager of Crosley for some time now, was an old G-E appliance man too. He proudly showed Crosley's very attractive new line of kitchen cabinets and sinks. George M. Dickie, for years with Thor Pacific, has teamed up with Frank L. Pollard, another old-timer in appliances, as manufacturers of special housewares, called Affiliated Factories. They will even have a washer and ironer under their own name made in Oakland soon.

There's Lloyd Sutton, former RCA man, now sales manager of Frank Edwards Co. Cliff Russell, longtime sales manager for Wesix, now has a manufacturers agency of his own, Russell & Co., handling Lear radio, Electromode air heater, Mulvaney air heaters, and Nesco roaster. Likewise Meier-Murphy Co., both former Westinghouse appliance men, are with a firm of their own, handling Faraday Electric's unique line of fluorescent lighted window curtain valences and chimes, roasters and table appliances, as well as Midwest fans, and heavy-duty electric ranges. Cleve Rosenberg, former Frigidaire man, returned from the Army to join Lynn & Chemnitz, factory representatives. Fred Lindquist, former Hotpoint man, was up from Los Angeles, where he is manager of the Norge division for Leo J. Meyberg. And there were many more.

A new affiliation of two old-timers, is Maryon & Williams Co., of San Francisco and Los Angeles marts — Art Maryon known for years as a lamp manufacturers representative, and George Williams, appliance man. Besides Marbro lamps, they now represent Conlon, and had washer and ironers on display. Kaemper-Barrett, experienced appliance distributors, were still waiting for samples of the Admiral line for which they are distributors, but J. A. Keim, Roval vacuum cleaner, had samples for J. T. Barrett to show.

Just as before the war, there were many of the stalwarts back to greet

Top: J. M. Tenney and Fred Lindquist of Norge tell new features. Center: Thompson-Holmes displayed Philco, Universal and other lines. J. T. d' Ettienne at right. Bottom: The new Zeniths with Cobra arm kept H. R. Basford's gang busy all market week

their former customers: Fred Fenton of Easy washers, with the new little Whirldry which Easy now will offer; R. G. Hutchison and "Robby" Robinson of Frigidaire, back in the Mart with a fine display and the regional offices; C. J. Bachman and Cal Fleeson of Kelvinator, with models to show of range and refrigerator, and giving space to Fred Fowler of Portland for his glass-lined water heater, and Morton Kitchens; Dick Henning and others from G-E Supply, showing a new steam iron by G-E and featuring the electric blanket which ought to be one of the really hot new appliances; L. H. Bushnell, Magnavox representative, without even a dummy cabinet to show but lots of interest in the line; A. A. Kuhnhausen of ABC, disappointed not to have the new automatic to show but making up for it with the new ironer; J. M. Tenney, Western sales manager of Norge, up from Los Angeles and pointing with pride to his line in the Meyberg exhibit; Gordon Wilkins, still convinced that demonstrations sell Ironrites and planning a revival of his extensive staff of trained demonstrators, and plugging a new line, Rainier water softeners, which he feels are the boon companion for the automatic washer and the dishwasher; Howard Scaiffe and Al Baughman of Hotpoint, with ranges, refrigerator and water heater, but waiting until later to put in the latest full kitchen; J. T. Templeton at H. R. Basford's crowded display, where the Zenith and its Cobra arm was the center of attraction; Lou Stull at Apex, displaying conventional models but describing vividly the sensational new Apex automatic only shown at Chicago recently; Alex Kuehlthau and Ben Sanderson of Electromaster, assisting their new distributor, McCormack & Co., tell features of the line.

Two newcomers in refrigeration displayed there too. Modern Appliance Co. of San Mateo, showed its Rogers home freezers and the American freezer. Chapman of Corvallis, Ore., showed its plastic cabinet home freezer in life-sized cutout.

Down on the main floor among the gorgeous beds and mattresses by Simmons lay two of its new pride and joy, the electronic blanket. It differs from the G-E in that a parallel thermostat wire is run alongside the resistance wire for controlling its temperature.

So it was a great market after all, even if an unusual one.

Top: R. G. Hutchison and R. E. Robertson in Frigidaire's new Western headquarters. Center: John Barker, Montgomery Ward now, visits E. W. Isenhower in the Westinghouse model store. Bottom: Jim Marshall demonstrates the Easy spinner to a dealer

Swamped

Sylvania's Bishop holds back sales program now

Loaded down with orders since both its major competitors have been shut down by strikes, Sylvania Electric Products, Inc., its general sales manager, lighting division, Robert H. Bishop, told groups of that company's lamp distributors at meetings in Los Angeles, San Francisco, Portland and Seattle, will lay aside its promotion program until later and just try to fill orders. Originally Bishop's trip was designed to have him launch extensive sales and promotion programs featuring Sylvania fluorescent and incandescent lamps, lamps package kits, fixtures and its proposed new line of domestic fixtures.

Instead he brought his hearers up to date in a characteristic off-hand manner on who Sylvania is, what it had done and how it stood in the lamp and radio business. From $9 million net sales in 1938 to $123 million in 1945, with leading position in fluorescent lighting fixtures, lamps and incandescent lamps and radio tubes, he told of the establishment of warehouses in Seattle and Los Angeles, the starting of a new radio set plant in Riverside, Calif., to make sets exclusively for Sears Roebuck, and the staffing of sales and engineering officers in San Francisco, Seattle and Los Angeles.

George Sommers, Pacific Coast sales manager preceded Bishop with a brief review of Western operations and told of the company's continuing surveys (See ELECTRICAL WEST, February 1946, p. 117) to determine lighting markets. He introduced William Kennedy, newly arrived Pacific Coast field engineer, formerly with the Chicago Lighting Institute, who will work with customers on major lighting applications.

Chick Field, tall, informal Los Angeles manager of Sylvania, was an appropriate toastmaster for the meetings, acting also in that capacity to introduce Bishop when the latter addressed the Los Angeles Electric Club on Jan. 28. Bishop told that meeting some of the results disclosed in the surveys of residential and commercial users of light, indicating great interest in fluorescent lighting and as yet only partial use of it.

B.C. Service League

During the war, the chief activity of the Electrical Service League of British Columbia, at Vancouver, B.C., has been that of field service in connection with wiring of houses and in advising regarding lighting installations. With materials for construction under restrictions and appliances almost off the market, naturally this work was limited, but it is significant that it was maintained throughout the war which, in Canada, was for six years.

Now with the war over the home appliance council, which had been started before the war, is to be re-established in connection with the B.C. Electric dealer plan. Preliminary meetings have been held with this in view.

A postwar market survey, being made by the power company, will be made available to the entire industry as a guide to its programs for appliance sales.

Lifting of all restrictions on fixture materials has resulted in a large number of inquiries for lighting service, R. Hall, manager, reported in his last annual report. In answer to these requests, a large number of plans and specifications have been prepared and delivered. With an increase in the power company lighting staff, which is loaned to the league to take care of these inquiries, considerable business in industrial and commercial lighting is expected this year.

The Vancouver Electrical Assn., the electrical contractors organization, has worked closely with the league throughout the war. It has carried on educational meetings jointly with the league, the various manufacturers presenting informative programs regarding their products to the contractors. The association has set up a number of committees: Social and educational, L. Sewell, chairman; legislation, E. Dunsmuir, chairman; residential wiring, E. Clay, chairman; industrial wiring and motor dealers, B. Graham, chairman; merchandise, R. Wallace, chairman; price book, B. Hutchinson, chairman; rehabilitation, J. S. Homersham, chairman; publicity, S. A. Vey, chairman; budget, R. Sutherland, chairman and membership, T. Barwood.

Work is also in progress in the revision of a price guide which has been kept current by the association for many years. Plans are being developed by the merchandising committee to permit dealers to take out associate membership in the association, as it is believed this will have the effect of coordinating the activities of all branches of the electrical industry.

Endeavors to secure legislation requiring an examination before electrical contracting licenses are issued in Vancouver have so far been unsuccessful and the legislative committee will continue its efforts toward this end.

There were 2,252 houses out of 2,792 in 1945 wired for electric range.

Phil Carlstroem, salesman, William Kennedy, new field engineer for the West, and John Burdick, salesman, of Sylvania's San Francisco office, at right. Robert Bishop, sales manager. George Sommers, O. R. Doerr, G. W. Field

ELECTRICAL WEST Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © MARCH 1946

Roll Your Own Market Studies

RUNNING a successful business is similar in many ways to running a successful military campaign. Both depend a lot on "intelligence" or knowledge ahead of the conditions that will be encountered.

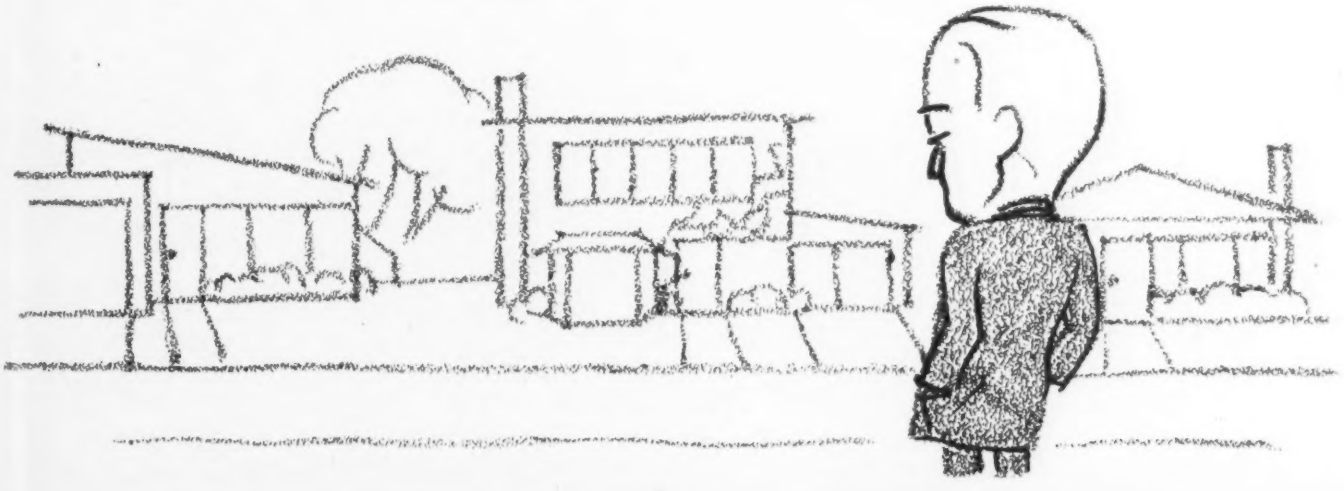
Business "intelligence" is usually called "market study" or survey of the market. On such a study the successful electrical retailer will not only plan his selling but select his merchandise. On the intelligence he derives from such studies he can decide whether to be satisfied to cultivate intensively his own immediate neighborhood of operations or to reach out into other neighborhoods to attract prospects and customers to his store. It will determine his methods of going after business.

Market studies sound hard but they need not be. They can be mighty interesting. Making them would be a profitable way to spend time awaiting the advent of new merchandise. When it comes you would know just where to sell and how.

Sources of information are: 1. Your local utility. 2. Your bank. 3. Your chamber of commerce. 4. Your wholesale distributor.

Kinds of information to seek are: 1. Number of electric meters, population, average annual kilowatt-hour consumption per residential customer. 2. Income level of the neighborhood. What its source is, such as farming, mining, industry, retail trade, etc., because this may affect sales and credit on account of seasonability. 3. Total retail sales.

The number of meters gives you the size of your potential market, and the annual kilowatt-hour consumption indicates how well sold those people are on using electricity. It also gives a hint as to the replacement possibilities. If they use lots of electricity, they have many appliances and should be ready to replace more of them



with new ones. Many should be worn out.

Facts about income and sources of it are very vital in determining the class of appliances to stock, the price range, the granting of credit and making of collections. The total retail sales for the area give a good indication of its past buying power and spending.

A wise dealer will look around him and size up his competition. First there is the direct competition of other appliance dealers in his neighborhood, then the large stores which also reach his customers. And not to be forgotten is the competition of other things, new cars, new houses, new clothes, new furniture, travel and sports. A little study of the people will pay out when you do your planning.

If you have been in business some time your own records may be made a most valuable source of sales "intelligence." A wise dealer in San Jose has kept 5,000 appliance repair data cards accumulated during the war years as his service shop did repairs for customers. On them he has a record of the age and condition of every appliance and even information about other appliances and wants in those families. Now his salesmen have the best prospect list in town.

Working on Other People's Money—Credit

"American business," says Dun & Bradstreet, Inc., "could not exist for one day on a C.O.D. basis. Credit, being 'man's confidence in man', is transferred almost instantly from coast to coast, and as a result, 92% of the dollar volume of commercial transactions in peace time is handled on credit terms. Credit played an outstanding role in the growth of the nation and the credit thread is interwoven throughout the whole fabric of trade."

Every business operates on credit to some extent. It may take various forms. It applies both to credit used for capital and for operating, as well as credit extension to customers. Large businesses have experts to handle such matters. The small business man can also get expert help from a good bank.

In a bulletin, "Credit Sources for Small Business," the U. S. Dept. of Commerce advises that the private commercial bank is still the main source of business credit. Under some flooring plans the manufacturer or distributor in essence is the banker.

Once the small business man has chosen a banker, says the bulletin, he should consult him frequently, visiting him at his office and inviting him to return the visit. "Show him around. Invite him to look over your books. Freely explain your plans to him, especially if they involve expenditures out of the ordinary. Do not try to conceal difficulties from him. It is part of the banker's code not to betray confidences. Mutual frankness is the first basis of good banking conditions."

Such discussion with the banker will bring out the differences and purposes of various kinds of loans. "Small concerns have often resorted to the unsound practice of using renewable short-term commercial loans for working capital, for long-term seasonal capital, or even to take the place of fixed long-term capital." This is too expensive to long continue.

In general, the bulletin says, a business man is justified in seeking a loan when he can use it to cut costs or otherwise increase efficiency **by more than the cost of obtaining additional funds,** but he should not forget that, other things being equal, the company that gets the credit it needs at the least expense to it, wins.

In "So you want to be your own boss," Robert F. Chisholm, Canadian business man, writing in "Printers Ink" magazine, said, "Here is some dangerous advice. Don't be afraid to borrow. Sometimes it is easier to swing a big deal than a small

one. Some retailers feel they are not taking advantage of their opportunities unless they are taking advantage of their ability to borrow. Some retailers do not feel happy unless they owe money to the bank. Within limits they are right.

"But a strong word of caution. **Loans usually have to be repaid.** They may be called at any time (except certain Government 20-year loans). You **must** consider what your position would be if the loan were called, what you would do to meet the call. You must have a hedge, or a way out in case that should happen. Borrow money only if you **should** borrow it, as an ordinary commercial transaction, and through ordinary commercial channels, not as a last resort of desperation.

"Don't ever borrow money for a business if you have to pledge your shirt. If you do that, your business doesn't justify a loan."

Although a good deal is written and furnished by manufacturers on matters of store location, display and merchandising methods, underneath all must be a solid foundation of sound financing and credit, as well as cost control and credit granting control. That is why, though elementary for the old-timers, it is well to refresh the memory by considering them again now.

Credit Granting that Pleases People

Third of a series of good sense articles on business management

by **KEN HAMPTON**

CREDIT is the symbol of civilization. Every credit transaction stands as a vote of confidence of man in his fellow men. Barter is only carried on in those lands where people distrust each other, because, as soon as trust and confidence is established between people, it leads invariably to the acceptance of a promise to pay at a later date.

All business transactions start and end with cash. If they end with more cash in hand than they started with, they are successful. If they end with the same amount or less, they fail.

The right financing plan is vital to any business. Customers fear and distrust financial operations they do not understand. When it comes to the financial end of any transaction, both parties must thoroughly know what is expected of them.

To assure the completion of the transaction and its profitable return in cash, it is important to the seller that he know the risk he is taking when he extends credit, because he is parting with the product of his labor. Parting with money is equally important to the purchaser, as he is giving up his savings for goods to be used or enjoyed. Between them there must be confidence and understanding.

The extending of credit rests upon character as well as financial or earning capacity. Character is the guarantee of justice and fairness in all credit relations. Permanent success in granting or receiving credit cannot be divorced from character.

It behooves the merchant to have a very definite credit granting policy and put the granting of credit into the hands of capable, well-trained men of proven judgment. The policy he adopts must be fair so that he will merit the confidence of his customers.

Financing must be easily understood. The time, place and manner in which the goods delivered are to be paid for must be thoroughly understood when the credit sale is made.

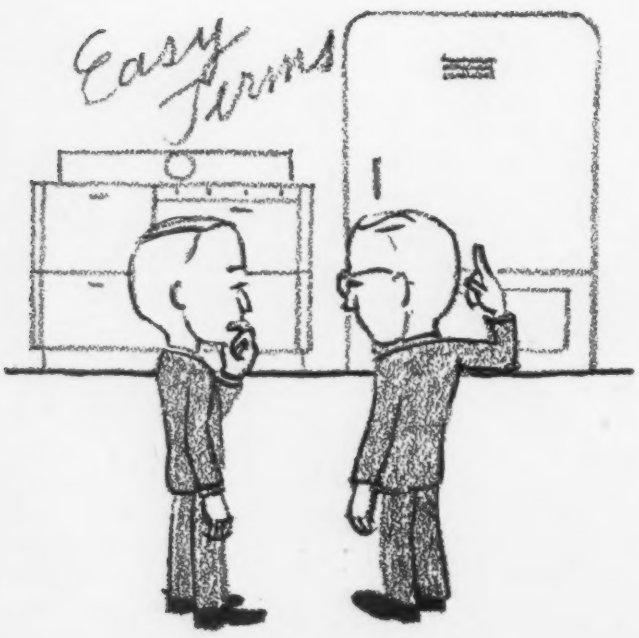
The customer to whom the merchant extends credit becomes a friend in whom he believes and upon whose word he relies. It is especially important that this be re-

membered by the merchant's office staff when it becomes necessary to remind the customer of his failure to pay his indebtedness. He is still a trusted friend and should be addressed as such.

Even in his delinquency, he should still be dealt with courteously. If firmness is necessary, it can be applied with the same courteous understanding with which a friend one is disappointed in is corrected or advised.

In checking the financial efficiency of his business, the merchant will do well to consider the following points:

1. **What terms on charge and installment sales are customary in his industry? Further, how can he use customer terms to best help his business please people and grow?**
2. **Can he grant these terms without jeopardizing his capital?**
3. **What terms, if any, can he grant without charging interest?**
4. **What rate of interest should he charge?**
5. **Should he extend the same terms on all merchandise offered?**
6. **Since his object is to get back cash, is there any way he can transact all of his business profitably for cash and not grant any credit?**
7. **What terms would be most advantageous to him and his customers? He should never hesitate to adopt terms to his specific locality. Such things as pay days may be very vital to his customers' paying convenience.**
8. **Has he a satisfactory method of getting information on prospective customers' financial standing and paying habits?**
9. **Are his accounts reasonable and credit records well enough kept so that both he and the customer are fully informed at all times about the account?**



How much ADDITIONAL Sales Volume Must Be Obtained

TO OFFSET CREDIT LOSSES

This table shows additional sales required, according to the annual net profit earned by the business.

Pct. Profit	Loss $20	Loss $50	Loss $100	Loss $300	Loss $500	Loss $1,000
1	2,000	5,000	10,000	30,000	50,000	100,000
2	1,000	2,500	5,000	15,000	25,000	50,000
3	666	1,666	3,333	10,000	16,666	33,333
4	500	1,250	2,500	7,500	12,500	25,000
5	400	1,000	2,000	6,000	10,000	20,000
6	333	833	1,666	4,999	8,333	16,666
7	286	714	1,428	4,385	7,142	14,285
8	250	625	1,250	3,750	6,250	12,500
9	222	655	1,100	3,330	5,550	11,110
10	200	500	1,000	3,000	5,000	10,000

10. **Are prices and terms stated on copies of invoices and contracts given customers?**
11. **Are there any features about his credit policy or terms that should be featured in his advertising?**

Now that the war is over it may be thought that credit may not be needed to sell merchandise. It is well to remember that many have used up their surplus earnings of the war period and may not be able to buy for cash as had been anticipated. The return of credit selling will probably come sooner than was previously thought.

The year ahead is one in which it will be well to beware of over-extending credit. It may be a year during which great displacement of people will be taking place. The change from war industry and trade will make for instability of credit risk.

War is always accompanied by a diminishing respect for obligations. High earnings during the war may lead workers to have a distorted view as to their earning ability. The inflationary trend likewise upsets their ideas as to the purchasing power of earnings. Commitments for purchases may be made far in excess of normal requirements and normal income.

These conditions should be recognized and losses guarded against by careful investigations before credit is granted. A good rule to follow is to grant credit on the basis of **normal** earnings rather than inflated wartime earnings.

It will be well to double reserves for bad debt losses to provide for the unusual risks that will attend operations in spite of the most careful planning.

Proctor Goes "All Dealer" Distribution

Distributors given definite pledges of strict, clean-cut policy, and ample sales help backing

WITH a policy that dealers themselves had told Proctor they wanted, that company placed its future squarely in the hands of its dealers and distributors at a series of meetings throughout the West conducted by Charles P. Culbert, Western regional sales manager and Tom Jones, assistant general sales manager, and the district manager in each locality. Clearing itself of all distribution direct through chains, canvassing organizations, utilities, department stores or buying clubs, Proctor Electric Co. has declared itself all out for straight-line distribution through selected distributors to dealers.

Tom Jones told the distributors who will handle the line that Proctor will: (1) Not build down to a price, but will build a quality line, a short line; (2) sell only through its franchised distributors to dealers; (3) sell on a limited but not exclusive basis, to avoid wasteful duplication; (4) chain stores, department stores or dealers will not be sold direct; (5) catalogue houses and other destructive influences will not be franchised; (6) nor will there be discounts for industrial or employee groups; (7) the dealer may sell other lines but is expected to make Proctor the first or second in his effort; (8) the district manager will cooperate in training and promotion; (9) merchandise will be allocated while scarce, on a fair basis; (10) prices will include adequate profit both to dealer and distributor; (11) prices will be protected by Fair Trade agreements in all states where the law exists; (12) advance notice will be given by the company of any model changes.

Truman Ball, San Francisco district manager, and other district managers in their respective territories, told distributors that every manufacturer of appliances plans to increase 1941 production. The industry in 1941, some 49 manufacturers, produced $35,000,000 in table appliances. In 1946 these same 49 plan twice that, and some 50 new ones will bring the total to $140,000,000 (which roughly is more than $1 per man, woman and child in the U. S.) Hence distributors and dealers must prepare to really do some selling. "In the event the public appetite is not equal to it," said Ball, "there may be the greatest case of hyper-indigestion this country has ever had," especially since so much of the so-called pent-up demand has been eaten up by unemployment due to strikes and higher costs of living.

Proctor has shortened its line. It will have two instead of three heel-rest type irons, only one instead of three "Never-lift." It will have two toaster models instead of five; one model roaster, and next year a new model waffle iron. Irons are now in production and the first promotion on them will come in June. Toasters will be delivered in quantity in the third quarter, roasters the third quarter and the waffle iron next year.

Prices too were announced. The heel-rest iron will sell at $9.95, the 1,000-watt "Never-lift" at $10.95, the delux "Never-lift" at $12.95, the toaster, $14.95, and the delux toaster, $16.50. Previewings of the delux iron and toaster were also afforded the distributors, as well as a full showing of present models.

Culbert told the story of the Proctor continued advertising during the war, and the promotion plans and advertising now. He also showed the advertising and display material for the first iron promotion in June and gave a simple demonstration of the "Never-lift," which he asked the distributors to get the dealers to feature. He also gave definite dates upon which the material will be distributed.

In Los Angeles, all of the Western district managers of Proctor met for a three-day sales conference prior to Culbert's series of distributor meetings. Attending were J. C. Ivy, Denver, E. I. Snyder, Seattle, Carl Birkhold, New Orleans, W. R. Edmonson, Dallas, T. W. Ball, San Francisco, G. E. Newlin, Los Angeles, district managers, and R. M. Oliver, vice-president and general sales manager. Proctor Electric Co. was separated from its parent company, Proctor & Schwartz Inc., Jan. 1.

Charlie Culbert shows the advertising materials and promotion kits to launch first iron campaign in June this year

"Bendix is Hot"

New to the trade although experienced in producing radio and radar equipment for England and the U. S., Bendix Radio and Television Co., Baltimore, aims to be among the top five makers of radio in the country, its general sales manager, Len Truesdell told a group of executives of Graybar dealers at a Bohemian Club luncheon, Feb. 6, San Francisco. "To the company that is standing still," he said, "we're going to give 'em hell."

With great financial resources, intensive manufacturing experience and a staff of sales executives from the retail industry like himself, Truesdell declared, "Watch Bendix. It's hotter than a pistol." Emphasis both in design of cabinets and in selling plans will be retail emphasis.

Following the luncheon, the Bendix exhibit, unable to get in the Mart, was opened to the trade at the Whitcomb.

Phil Carson, San Francisco manager of Graybar and Blaine R. Lind, district merchandising manager, were hosts at the luncheon.

ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO 4

The all-industry magazine of progress, established 1887 and incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity." Contents Copyrighted.

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Pronouncement For the Record

CONGRESSMEN who are being importuned to appropriate vast sums for a network for federal transmission lines which would blanket the far West might well ponder the reasoning of the California State Railroad Commission. In a recent decision affirming a contract under which Southern California Edison Co. will transmit Boulder power for the account of California Electric Power Co., the commission said:

"Fixed charges associated with heavy capital investments constitute a substantial portion of electric rates and the commission believes that many economies can still be made by promoting the joint cooperative use of inescapable investments in capital facilities to the optimum degree. Splendid results have been achieved as the result of pooling generation and transmission sources. The public interest requires that such activities be encouraged, continued and expanded and that the needless duplication of electrical capital investments be discouraged, and, in so far as we have jurisdiction, prevented."

Study of the plans of the various federal agencies dealing with electric power will reveal the extent to which their proposed transmission lines duplicate existing facilities. The pronouncement of the California commission gives little solace or satisfaction to the proponents of these federal networks. While some may point out that the California commission has no regulatory powers over federal facilities, nevertheless its fundamentally sound thinking has been put into the record where it can guide those who control the purse.

Krug For Ickes

SUBSTITUTION of J. A. "Cap" Krug as Secretary of the Interior in place of Harold Ickes, the self-styled curmudgeon, may not warrant a week of riotous celebration by the light and power industry. However, there should be loud sighs of relief and a reasonable belief that the skies are going to be much less cloudy.

Ex-Secretary Ickes, with his "come hell or high water" government power policies, has given the power industry some bad moments. His proclivity for name-calling, his belligerent advocacy of government power, his antagonism toward the electric utilities and his reframing of the policies of the U. S. Bureau of Reclamation from irrigation to electric power, made his name an anathema among utility people for thirteen years.

Secretary Krug takes over the office with a record which includes a long background in public power. With this is coupled a realistic knowledge of the industrial complexity of the U. S. It is well known that he is a seeker after facts and that he goes by results rather than adhering to theory. During the war he opposed the Ickes government hydro power program and permitted utilities to install badly needed steam generating capacity. He has demonstrated that he is opposed to government controls and regulations. While he may be a public power exponent, his relations with the power industry promise to be much more realistic than those of his predecessor.

Farmers and Cheap Power

ELSEWHERE in this issue an executive of the Farm Bureau looks critically at the farmer's stake in the power aspects of the Central Valley in California. His experience in translating generalities into concrete facts relating to actual agricultural operations seems typical of those with government power agencies in other sections of the West. The policy of comparing 12-mill power costs and 5-mill power costs without qualification or explanation, but solely to make the point that government power is "cheap", merits all of the criticism that Mr. Dueul directs at it. It is equally as misleading as comparing the average residential kilowatt-hour costs on a system where use is only 1,200 kwh. per year, with those where use is 2,500 kwh. per year. Yet this is a favorite argument for public power.

Every student of third grade arithmetic knows that apples and bananas are not subject to joint

manipulation under rules of addition, multiplication or division. They remain apples and bananas to the end. However, expert concocting can turn them into applesauce and banana oil. The rate comparisons of some federal power advocates, in violating the rules of arithmetic, ultimately bear resemblance to the sauce and oil.

Appliance Trickle

IF the old saying that a drop of water falling on a stone through the years will wear away the stone holds for appliances, too, then perhaps the trickle of appliances and radios now dropping into the country will wear away the stone walls holding back that selling boom that once was dreamed about. It is a credit to the appliance industry that it has been able to get some things started under the handicaps of materials, labor, pricing and transportation.

These appliances, serving mostly as samples now for the taking of orders, are welcome strangers after so many years absence. They dress up the appliance stores or departments and give tangible hope that others will follow some day.

Even if their presence is tantalizing to those who may only order and not possess, at least the reality of them is assuring. If samples come, can stock be far behind?

Homes for Veterans

LIKE everything else these days the housing problem is being attacked with wishes and theories instead of realism. Because the old traditional ways of producing houses are slow and they are tailor-made instead of factory-line stamped out, the newest housing authority is determined to change it all by pressure and directive, and presto, the problem should be solved. However, the only thing that seems to be stamped out like cookies is not houses but housing agencies. And again the irresistible force meets an immovable object.

Where housing is choked off is not in big things but in thousands of tiny details. And the tiny details are all out of balance because of meddling with the natural laws of supply and demand and human nature.

Western cities have been blighted during the war by mass-produced flimsy and shoddy housing, designed only to last a couple of years. In desperation for places to live, these substandard war tenements continue to be occupied. If this new program goes the way of the theories, these same cities will receive more permanent blights of housing only a bit better than those of the war. Cheap materials, hurried workmanship, inadequate wiring and lighting, mediocre facilities of all kinds will be expedient. In ten years these shacks will be shabby and not worth repairing.

With the entire electrical future of each house at stake, the electrical industry can ill afford to swing into such a regimented pattern of mediocrity without protest. There is more to it than spoiling the landscape with barracks and boxes. The program threatens to make a ceiling on electrical usage, patterned on a low standard of living and so tied in place by inadequate wiring that we can never grow out of it.

Moreover, if the private citizen is not to be permitted to build, there is no sense in directing adequate wiring promotion at him. If regimented housing is here, then every effort should be made to get as much copper and adequacy into the cookie-press as possible.

THERE is a creative quality in the human spirit which manifests itself and develops only in the atmosphere of freedom. Under the inevitably oppressive and restrictive rule of unlimited government, this spirit simply cannot live. The price of prosperity is the recreation of the atmosphere of freedom, which was the indispensable element in our past achievements. For more than a decade now we have been increasingly stifling the incentive, the initiative, the "plus" effort, the hopeful and more highly creative endeavors of our people. In its stead we have been cultivating and spreading the ideal of the collectivist society, the end of which, for the individual citizen, is that he is "sunk without a trace," becoming a mere regulated, controlled and directed unit in a collective grouping . . . We are presently on the road of becoming not a juster and more generous people, but a more self-centered and weaker people, who are surrendering self-reliance and substituting reliance upon the directives and edicts of men clothed with great governmental power. This menacing growth of big government has been met with only half-hearted, lukewarm defense, and worse than that, an attitude of appeasement and surrender in the face of a determined and cunning attack on basic American institutions. "What can we do about it?" is often asked. Well, if you or some member of your family were becoming enmeshed in the toils of an enslaving drug habit, what would be the common-sense, constructive solution of that problem? Would it be to find some half-way or middle ground upon which you could live with the habit? No, your objective would be to find a means of breaking the habit entirely and as soon as possible.—W. C. Mullendore, president, Southern California Edison Co.

PCEA *Panorama* — *Edited by A. X. Schilling*

Committees Meet

Internal auditing, purchasing and stores discussed

HERE is a summary of the activities of some PCEA committees which have met during recent weeks:

Members of the Pacific Coast Gas Assn. and the Pacific Coast Electrical Assn, exchanged ideas during the joint internal auditing conference held in Los Angeles Dec. 19 and 20. F. J. O'Brien, Southern California Gas Co., was host chairman and the meeting was held in his firm's building.

In attendance were the following: Howard Boylan, L. B. Reed and J. A. Talley, California Electric Power Co.; C. H. McNulty, Coast Counties Gas and Electric Co.; Harry McGann, Pacific Gas and Electric Co.; J. Van Paddenburg, Pacific Lighting Corp.; I. L. Comstock, Pacific Public Service Co.; W. D. Chambers and H. M. Riehle, San Diego Gas and Electric Co.; Paul Boyington, C. B. Bradshaw, A. L. Chavannes, R. O. Cross, W. I. Priest, F. C. McLaughlin and W. C. Stroschein, Southern California Edison Co.; C. C. Becker, R. O. Metcalfe, Jr., F. J. O'Brien and J. Vanier, Southern California Gas Co.; J. Q. Abel, Southern Counties Gas Co. and Clifford Johnstone, Pacific Coast Gas Assn.

Discussion disclosed that all companies represented employed an audit program, known as an Audit Manual or Questionnaire, and that all audit cash and bank accounts, customers departments, pay rolls, materials and supplies. Most companies report on the efficiency of the personnel, while one company audits purchasing department, engineering department and gas purchase department. One company samples public opinion by calling on customers, and another accomplishes this by employing an outside agency.

Pay Roll Auditing

Considerable discussion was devoted to the matter of pay roll auditing and it was brought out that a variation is found among the methods used to establish that all employees on the pay roll were duly authorized, at properly approved rates and that hours were supported by time sheets or attendance reports. Some companies use rather elaborate methods to make this type of audit, while a few feel that the Social Security and Income Tax laws make padded pay rolls unlikely and therefore eliminate some features of the audit used by some companies.

After a discussion of sample audit reports and follow-up, the delegates were generally agreed on the merits of writing reports in the field, and of discussing the findings and recommendations with the head of the department before issuing the report. Most audit reports are simply bound, but one company supports its report with detailed working papers, and exhibited a sample report of 60 pages. One company employs a follow-up man in one of its operating departments to take the report to the personnel concerned to discuss the findings and to insure that the recommendations are being followed.

Cost Plus Contracts

Considerable interest was shown in this topic, and C. C. Becker, Southern California Gas Co., agreed to write a paper on the subject which will be mailed to all delegates.

Although one company makes periodical audits of the purchasing department, most companies do no auditing of that department. No company makes a practice of conducting an independent canvas of vendors, but one company does so when a price appears obviously out of line.

Payables through contingent funds are thoroughly audited by all internal audit staffs, but very little auditing by the traveling group is made of payables centralized in a section of the accounting-auditing department. One company does schedule these audits periodically, testing the promptness of payments, the taking of discounts, etc., and determining that proper information flows promptly among the purchasing department, accounts payable section and the stores section.

Audit of Large Billings

To a limited extent, all companies check large billings. Some companies accept the volumes furnished by the operating department and check from there on; others go back of this and reread charts, check the arithmetical accuracy of the meters, etc.

It was generally agreed that rotation of auditors is desirable, since it takes advantage of each man's outlook and approach to an audit, gives wider publicity to good methods, insures better audits through knowledge of all functions and makes the job more interesting to the auditor. However, most of the delegates mentioned that their staffs specialize, although they wish they could rotate.

H. Dean Campbell, C.P.A., former professor at the University of Southern California, addressed the group at the luncheon on Dec. 20. He mentioned that internal auditing in the more staple types of industry, such as utilities, is most susceptible to complacent inertia because changes in conditions are seldom violent. He urged that auditors remain alert to change or modify or augment their internal control as conditions and procedures change.

Purchasing and Stores

The Administrative Services Section held a two-day purchasing and stores group meeting with the Pacific Coast Gas Assn. in Santa Barbara on Jan. 24 and 25. J. K. Uhler, Jr., presided as sponsor. Those present were: H. G. Lawrence and K. O. Goodge, Southern Counties Gas Co.; William Maddock, Southern California Gas Co.; H. H. Scoville, Pacific Gas and Electric Co.; C. W. Pracht, Coast Counties Gas and Electric Co.; R. E. Rimoldi and William deWaard, San Diego Gas and Electric Co.; W. F. Ruth and C. R. Coulter, California Electric Power Co.; James Anderson, L. T. Dobbin, E. H. Truitt, W. E. Trumbull, H. E. Cox, N. F. Backus and J. K. Uhler, Jr., Southern California Edison Co. and J. P. Schaefer. Guests were: E. B. Cummings, B. W. Lane and C. W. Bourquin, Southern California Edison Co. and V. W. Hartley, Pacific Coast Electrical Assn.

Local Purchases

With William Maddock as discussion leader, the group considered the matter of developing local purchases to eliminate general office detail. At the present time, the general practice is to authorize local purchases for emergency needs, with a specific value limitation; discussion brought out that consideration is being given by some companies to the placing of purchasing department representatives in certain large districts to make unlimited purchases both for emergency purposes and to make stock replacements. The advantages of the plan include the familiarity of the representative with local market conditions and supply availability, but disadvantages would be encountered in the decentralization of purchasing control.

The discussion revealed that the majority of companies receive summaries of the monthly condition of stock, showing quantities on hand, unfilled orders, etc., to aid in forecasting

material requirements. Emphasis was placed on the need for such controls to anticipate relayed deliveries, and the further use of the records to minimize obsolescence was acknowledged. Close coordination of the purchasing and stores functions was stressed as an essential to efficient operation and in holding inventories at a satisfactory level. H. G. Lawrence acted as discussion leader for this topic.

H. H. Scoville lead the discussion of store plant layout as a means of conserving manpower and reducing material handling costs. The discussion resolved into the following conclusions: Stores should be ground-floor only, constructed at truck-bed height; the structure should be as nearly square as possible, with receiving and shipping facilities located on opposite sides of the building; material subject to inspection or testing operations should be received, stored in and shipped from a location in close proximity to the testing or inspection bureau; sufficient space should be provided on private property for maneuvering of delivery trucks.

Material Handling Equipment

Photographs of equipment now in use by various companies for lifting and moving purposes were shown during the discussion on this subject. The San Diego installation of a monorail construction was of particular interest, and other new types of such facilities were discussed.

The installation of announcer systems in plants is generally worthwhile, the delegates agreed. Such equipment saves a great deal of time, discussion disclosed, and announcer systems often are found to pay for themselves in a relatively short time. Discussion leader was William deWaard.

J. K. Uhler, Jr., lead the discussion on the simplification of stores accounting procedures, and the stores accounting methods employed by various companies were described by representatives present. The group discussed the advantages of centralized stores accounting in eliminating clerical work in transferring money value between store stocks and the application of machine methods instead of manually posted stock ledgers. The practice of charging out normal truck stocks as a means of eliminating clerical detail was discussed and it was pointed out that, under this system, tools are checked against a standard list for the truck at infrequent intervals.

A general discussion was had on the procedures in use in placing orders. Each company representative described his company's method of placing orders by the general store with the purchasing department and placing requisitions on the general store from district offices. Records and follow-up procedures were stressed as being vitally important under today's market conditions. N. F. Backus acted as discussion leader.

Coordinated

On Jan. 10, the board of directors met in Los Angeles. Victor W. Hartley, managing director, reported that his recent meeting with NEMA officers in New York City regarding Code and Ordinance activities had developed that many of the issues which had appeared controversial actually were based largely upon misunderstandings. Mutual agreement had cleared up these misunderstandings, he reported. The desire expressed by NEMA to have a representative of its legal department meet in Los Angeles with a representative group of city attorneys was reported to the board. Hartley said that such a meeting is desirable to give NEMA a personal contact with the California legal viewpoint. The board approved his request to arrange a luncheon meeting with the association as host, during which the NEMA representative could become acquainted with representatives of the League of California Cities.

Further investigation of facilities likely to be available will be necessary before a definite decision can be reached regarding the proposed convention, and the president and managing director were requested to conduct such investigations. Should a 1946 convention be found impractical, it was agreed that a spring conference should be held, either jointly or separately north and south, as conditions dictate.

IES Meetings

E. E. Ackland, illuminating engineer, Canadian General Electric Co., has been elected chairman of the recently organized B. C. Chapter of the Illuminating Engineering Society. C. T. Bakeman, Northwest regional vice-president of the society, attended the meeting and presented the branch with its charter.

Other officers are: W. J. Lind, secretary-treasurer, and R. Hall, R. G. Scott and W. M. MacKenzie, managers.

● Stuart R. Williams, manager of the street lighting department, Holophane Co., of Newark, N. J., was speaker at the Feb. 1 meeting of Illuminating Engineering Society, Northern California Section, and also addressed groups of street lighting men at other meetings in Los Angeles, Portland, Seattle, Spokane, Phoenix, Boise, Salt Lake City and Denver. As a member of the IES street lighting code committee, he explained the new edition of that code soon to be published. In it recommendations will be for higher mounting heights, larger lamp sizes, more lumens on the pavement, better spacing of units and control of the light flux. He also frankly analyzed the various light sources, contending that the incandescent filament lamp still was superior in the fact that it can be more accurately controlled. The mercury lamps at present, he said, are misapplied but, with improved design to get smaller light source and better control, hold promise for the future.

● What The Changeover from 50 to 60 cyles would mean in the changing of lighting fixtures, maintenance of industrial lighting and industrial lamp applications were the topics discussed before the Feb. 6 meeting of the Illuminating Engineering Society, Southern California Section. Ted Sheppard, Department of Water & Power, and past president, told the need for maintenance of industrial lighting. E. B. Kruger, frequency change department, Southern California Edison Co., explained the frequency changeover program, and W. G. Darley, General Electric Lamp Department, spoke of industrial lamp applications. Charles Gibson, chairman, presided.

EMEA Officers

New officers to serve for the coming year were elected at a recent meeting of the Los Angeles Electrical Maintenance Engineers Assn. They are: President, Nels V. Swanson, Foxboro Institute; first vice-president, Henry Bush, Littlejohn-Reuland Electric Co.; second vice-president, Henri Ledeboer, Fox Studios; secretary-treasurer, Emerson H. Reichard, General Petroleum Co. New members elected to the executive committee are: Ledeboer, LaVearn Frye of Axelson Mfg. Co., and William Browning, of Gladding McBean Co. Other members of the executive committee are Swanson, Bush, Donald H. Byl, Reichard, John Zuponcic and Linders L. Warner.

● National Electrical Wholesalers Assn. has announced that it will hold its 1946 convention at the Stevens Hotel, Chicago, April 21-25. Managing director Charles G. Pyle also announces that NEWA is coordinating its efforts with Edison Electric Institute in completing a basic sales training program to be made available to all members.

No Substitutes

Greater Central Valley Chapter, IAEI, meeting at Sacramento, Feb. 5, tackled knotty questions. Vice-chairman W. E. Horne presided because Chairman C. R. Holland attended apprentice school.

F. Maier reported on Code questions discussed at the joint executive meeting of IBEW at Fresno. Most discussed was the shortage of certain electrical materials in the region and whether inspectors should accept non-approved materials, such as strap type ground clamps, conduit boxes without plaster rings, fluorescent fixtures without Underwriters' label, switches for disconnect not labeled as suitable for such service and without neutral terminal blocks. Kennedy Bliss, Board of Fire Underwriters of the Pacific, and Clifford Prud'homme, city electrician, objected since by lowering safety standards the public loses its only protection.

There was also discussion of licensing of armature winders and maintenance men and this led to questioning whether portable machines were grounded in city and state buildings. "Are inspectors always wearing their dark glasses when in such buildings, or are the buildings so poorly lighted that these things do not stand out?" was asked of those present.

C. E. Jarvis, secretary, reported 22 present and a good year of work promised ahead.

Wire Upsets

The model ordinance being prepared by a committee of the Southern California Chapter, IAEI, was discussed further at its Jan. 20 meeting by Kenneth Howard, chairman of the ordinance committee, and suggested changes are to be prepared for next meeting, March 27, at Beverly Hills. The January meeting was held in Former Chairman Jesse Ross' home city, San Bernardino, 67 attending. Paul Rodet, Los Angeles chief, is now chairman.

J. G. Moyan, Square D Co., presented several pertinent problems from the manufacturers' standpoint. First is misuse of knockouts by wiremen, who knock out too big a hole in a concentric ring through carelessness. Another is that, with the many changes in wire ratings in the Code during the past few years, manufacturers do not know what to count upon as settings for circuit breakers. For instance, 4/0 wire for years was permitted a rating of 225 amp. Then in the 1940 Code it was reduced to 160 amp. In the 1946 Code it goes up to 230 amp. These changes make manufacturers hesitant about developing breakers with the new ratings. He also said that variables to compensate for ambient temperatures are very difficult things to apply in the field.

Labeling of dead front switchboards, Moyen said, is also difficult when some component parts used may not be Underwriters' listed. Moyen also commended such committees as the one organized by Paul Rodet in Los Angeles, on which the inspection department, power companies, contractors and manufacturers are represented and which assist in standardizing such things as service cubicles, outdoor service units, etc.

In a letter George Kimball, California Division of Industrial Safety, called attention to Article 4130—Fixture Raceways, in the new Code which says that "fixtures shall not be used as raceways for circuit conductors unless the fixtures meet the requirements of approved raceways, except that the conductors of a single-branch circuit may be carried through a fixture approved for end-to-end connection." Some inspection authorities, he pointed out, do not permit Type R insulation in fixtures. Only that kind of insulation approved with the fixture is permitted.

Mountain Meetings

Plans are again being made for a series of three meetings of the chapters of the International Association of Electrical Inspectors in the Rocky Mountain region during early April, as they have been for the past several years. The Rocky Mountain Chapter, says Vic Moulton, secretary, will meet in Denver, April 4 and 5. The Utah Chapter date is April 9 in Salt Lake City and the Montana Chapter will meet as usual at Great Falls, April 12 and 13. Victor H. Tousley, secretary both of IAEI and of the Electrical Committee, Chicago, will attend the meetings and discuss the changes that were made in the National Electrical Code that will be issued in the 1946 edition late in the year. A local program of subjects pertinent to inspection and wiring also will be presented at each meeting. D. J. Wolters, secretary of the Utah Chaper, and J. G. Clune, of the Montana Chapter, have arrangements in charge for their respective programs.

● School Lighting and relighting was discussed at the Illuminating Engineering Society, Oregon Chapter, Feb. 13, by Donald E. Miller, superintendent of properties for Portland schools. The school man's approach to the problem was shown.

Directors Chosen

Southern California Appliance Assn. reviews progress to date

Directors were elected by the recently organized Southern California Radio and Electrical Appliance Assn., at its annual meeting, Feb. 13. Permanent headquarters were authorized at 1033 S. Grand Ave. Then at the first meeting of the new board of directors, Feb. 23, officers were to be chosen from the directors, and applicants interviewed for the full-time position of managing-director, Gerald Weston, former manager, having resigned Feb. 1, to accept a position in Cleveland with a national refrigeration association.

Reports on present and potential future conditions within the several divisions of the industry were presented to the 190 members present at the Feb. 13 meeting. Five speakers represented that many sections in the radio and appliance field.

Joe Spain, Packard-Bell Co., reported on radio; William Vogel, Electrical Appliance Service Corp., on laundry equipment; B. T. Roe, J. N. Ceazan Co., on refrigerators; William B. Cranston, Thermador, covered ranges and water heaters; Leo Allen, Barker-Allen Electric Co., expressed views of retail dealers, stressing the need for cooperative planning and action.

Members of the board of directors elected are:

Retail division, dealer group—D. C. Culbreath; Ed Price, Price Bros.; W. E. Tankey, H. C. & L. Appliances, Pasadena; George Nicholson, Nicholson's, Hollywood; Dave Langlands, Langlands & Schade, North Hollywood; Henry W. Brough, Brough's Home Appliances, Glendale.

Furniture group—Jack Kaplan, Western Home Furniture Co.

Chain store group—Charles Pawkett, Sears Roebuck & Co.

Distributors division—Walter Stickel, Leo J. Meyberg Co.; Lou H. Swenson, Sherman-Swenson & Associates.

Manufacturers division—Harry Fogwell, Thermador Electric Mfg. Co.

Service division—F. D. Roe, Appliance Delivery & Service Co.

Wiring contractors division—Harry Vancott, Vancott Co.

Utility division—Robert H. Cockfield, Los Angeles Department of Water and Power.

Directors at large—Howard K. Burdick, Department of Water & Power.

The membership approved the constitution and by-laws, adopted a budget for the year and voted to participate as a sponsoring organization in a home show now being developed. R. H. Cockfield, temporary president, conducted the meeting.

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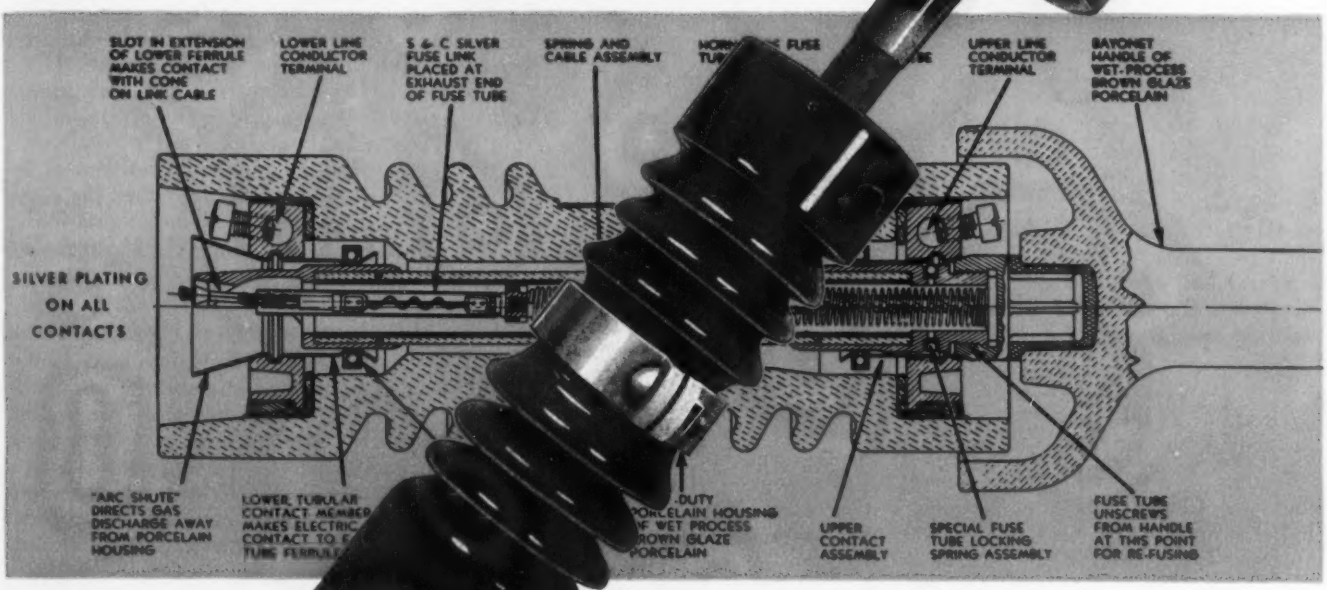
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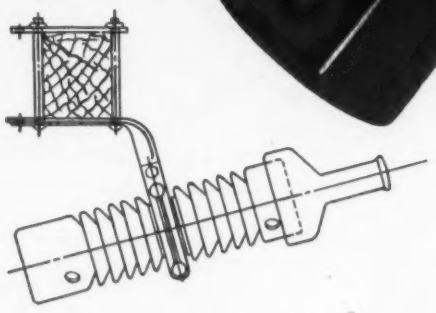
FUSE TUBE UNSCREWS FROM HANDLE AT THIS POINT FOR RE-FUSING



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Harris Elected

In a surprise, last-minute nomination, with the withdrawal of James M. Galvin as a candidate, the San Francisco Electrical Contractors Assn. Inc., a chapter of NECA, elected Tom Harris, H. S. Tittle Co., president; Everett Carlson, Central Electric Co., vice-president; Edward W. Scott, Scott Electric, secretary; George Smith, Smith Electric, treasurer, and H. C. Reid, Carl C. Severin, George F. Brayer, James M. Galvin, Galvin Bros.; Ed Conroy, Weber & Conroy; Pat Furlong, Century Electric Construction Co., and Grant Whitaker, Manning & Whitaker, as directors.

In the knob and tube section Lou Stolowitz, Associated Electric Construction Co., was named chairman, at a previous meeting of that group. Meeting dates for the San Francisco association were changed to the fourth Thursday each month. A dinner and entertainment was tendered James M. Galvin, retiring president, on Feb. 28, by members.

Promote Wiring

Meeting jointly with the Rocky Mountain Chapter of the National Electrical Contractors Assn., the Rocky Mountain Electrical League presented its adequate wiring promotion program and received an expression of wholehearted support from the contractor group. Speakers were Everett Collier, president of the NECA chapter, T. M. Foulk, chairman of the RMEL wiring committee, R. B. Hubbard, managing director and Meryl E. Mentzer, field representative of RMEL.

When Walter Heston, former engineering editor, ELECTRICAL WEST, now Pacific Coast editor *Electrical World*, stopped in Denver, a small meeting of the wiring group, including contractors, architects and the RMEL committee, discussed the adequate wiring standards recently adopted by various California groups.

Both the engineering and accounting groups of RMEL plan a two-day meeting at Pueblo, Colo., golf and country club, April 5 and 6. Conrad Jacobson, Mountain States Power Co., Caspar, Wyo., is to be in charge of the accounting program. L. A. Goalby, Westinghouse Electric Corp., Denver, has charge of the engineering program. E. H. Pemberton, supervisor of sales promotion, Southern Colorado Power Co., Pueblo, is in charge of local arrangements.

● W. J. LEE, Sherman Clay & Co., was elected president, Cass Running, J. H. Wiley Co., vice-president, and C. P. McCarthy, Pacific Gas and Electric Co., secretary-treasurer of the San Francisco Unit, Northern California Electrical Bureau at its annual meeting Feb. 14 at 10 a.m. The Westinghouse home wiring film, *Dawn of Better Living*, was shown, and W. A. Cyr presented indubitable evidence that all the evils and bad trade practices of the appliance business were part of the work of a Jap spy plot. Reports from the Appliance Section, by H. Conrad; the Lighting Section by Ed Dowd; the Radio Section by W. J. Lee and the Wiring Section by Everett Carlson were also given. W. O. Saxe, president for 1945, presided and was accorded thanks for his service.

A. E. Martin, new field representative for NECA for nine far Western States

Geo. Seaman, head of NECA field service, completes arrangements for new Sacramento Chapter with Wm. Welsh. Below, Martin and Buttner of Oakland

Anniversary EMEA

Tenth anniversary of the Electrical Maintenance Engineers Assn. of Southern California was celebrated Feb. 20 at Los Angeles with both an educational and a special meeting, attended by 180. Newly elected president, Nels Swanson, presided. Retiring President Clarence Miller was presented with a past president's button by F. L. Hockensmith, past president and honorary member. Past President Howard Parks was also made an honorary member for outstanding service. Jerry Ellis announced the annual stag for April 19.

Albert Albrecht, chief field engineer, Gilfillan Radio Co., presented an interesting educational film and lecture on radar landing control, closing by answering questions put by the audience. R. J. Clamp, past president of the IES section, announced that the latter was starting classes on illumination at Polytechnic Evening High School on March 4.

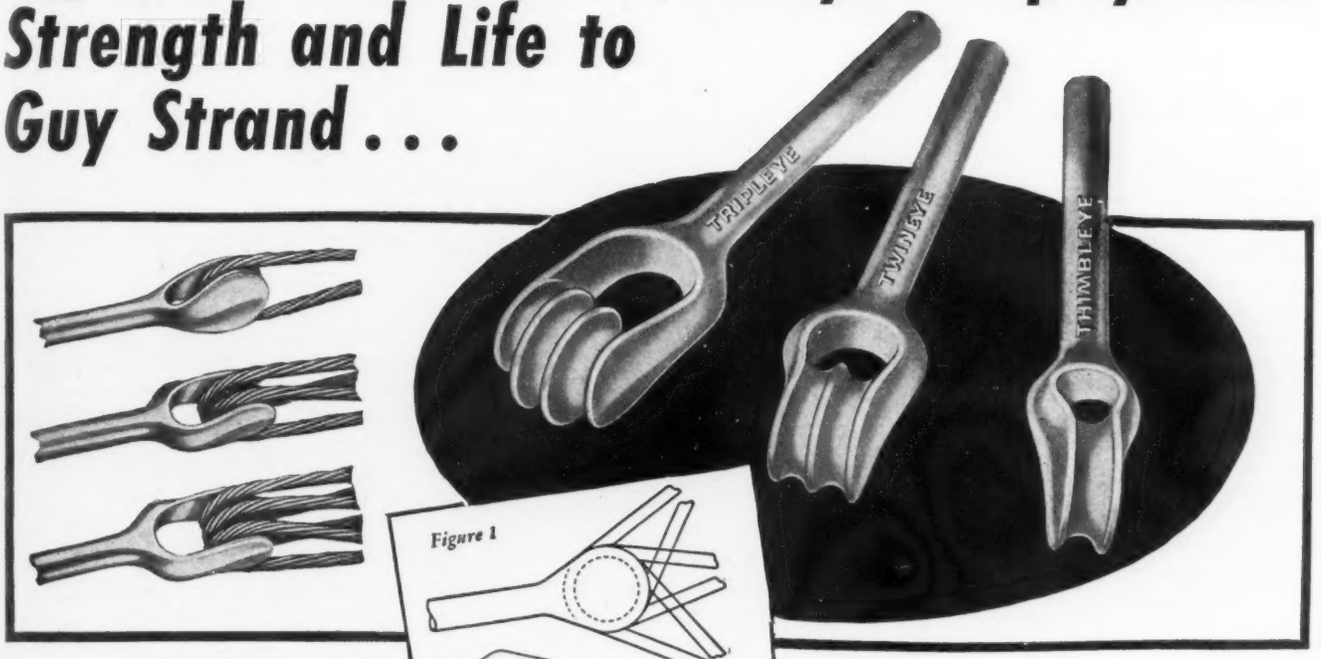
● VALENTINE'S DAY was meeting time for the Electrical Maintenance Engineers Assn. of Northern California, held at PG and E assembly room, 18th and Shotwell shops, San Francisco. Remi Bollaert, Westinghouse Electric Corp. engineer, presented the seventh electronic lesson, covering control features for motor drives. John M. Dodds, application engineer, General Electric Co. and author of three books on marine electrical wiring, talked on energy transmission.

NWEL & P

Four meetings of sections of the Northeast Electric Light & Power Assn. are to be held in April and May, according to preliminary announcement from Berkeley Snow, managing director. The Business Development Section will meet in Portland, April 15-16. The Engineering Section will meet some time during the week of April 22, in Seattle. The Accounting Section will meet during the week of April 29 in Portland. The new Personnel Section will meet during the week of May 13 in Salt Lake City.

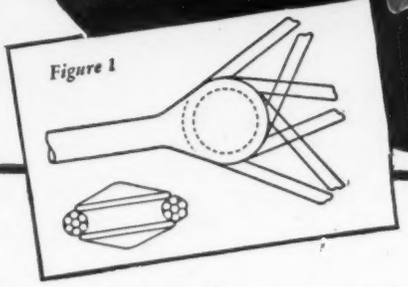
● C. R. BIGELOW has been elected president of the Intermountain Electrical Assn., formerly known as the Electrical League of Utah, succeeding Ora H. Barlow. E. E. Brazier, district manager of General Electric Supply Co., was named first vice-president, and J. T. Underwood, Ogden, Smith Electric Co., will be second vice-president, with additional officers including J. F. McAllister, secretary-treasurer and Elias J. Strong, manager.

Improved Thimbleye • Twineye • Tripleye add Strength and Life to Guy Strand . . .



Grooved to fit and protect Guy Strand

Figure 1



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The improved eye is drop forged on the rod as a perfectly shaped thimble and the sidewalls and groove of the eye extend all the way around the head of the rod. (See Figure 1, above.) This keeps the strand from flattening under tension, preserves its natural roundness, and prevents it from kinking at any one point. All grooves conform, in depth and width, to the largest cable size used with each rod or guy fixture. Grooves are deeper and give better support to the guy strand.

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3. ***PREVENTS*** injury to galvanizing and consequently rusting of guy strand due to kinks, bends, and breaks.
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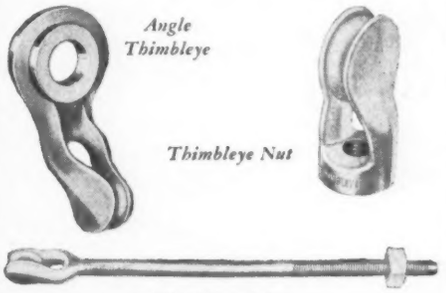
5. ***ECONOMICAL*** to install and maintain.
6. ***IMPROVES*** appearance of any guying installation.

Thimbleye Guy Fixtures

Can be used singly or in a variety of combinations. Guy may be attached to fixture while lineman is on the ground and then mounted on the pole, slack being pulled on the ground at the anchor end.



Angle Thimbleye

Thimbleye Nut

Thimbleye Bolt

C463

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CHANCE IMPROVED THIMBLEYES MANUFACTURED AND DISTRIBUTED BY THESE LICENSEES:

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Line Material Co. . . . Milwaukee, Wis.
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Kortick Mfg. Co., San Francisco, Cal.
Seyler Mfg. Co. . . . Pittsburgh, Pa.

NEWS of the industry

BONNEVILLE CONTRACT IS OFFERED WHATCOM COUNTY

In a new move in the proceedings of Northwest PUDs to acquire Puget Sound Power & Light Co. properties, Frank Ward, manager of Bonneville's Puget Sound division, last month submitted to Whatcom County PUD a proposed contract to meet the district's needs over a 20-year period. Whatcom has refused to buy power from the PUD pool. (EWEST, February, p. 130)

Under the proposal, Bonneville would agree to provide Whatcom with electric energy at a maximum rate of $17.50 per kilowatt-year. The 13 other districts involved in the purchase proposal already have signed up with the PUD power pool for a minimum rate of $17.50, with no ceiling.

Meanwhile Guy C. Myers, fiscal agent for the purchase, denied that bankers have refused to participate in a syndicate to underwrite the $135,000,000 bond issue.

President Frank J. McLaughlin of Puget Power challenged the statement of Bonneville Administrator Paul J. Raver before a house subcommittee that he had made a $90,000,000 offer for the properties in March 1944, while acting for the districts, the city of Seattle and the federal government. McLaughlin said that Raver merely had asked the company if it would sell for such a sum, and that the reply was that evidence of ability to perform had not been presented and that the figure was grossly inadequate.

In his testimony late in January, Raver stated that his $90,000,000 offer could not properly be compared with the $135,000,000 figure tendered by Myers because the latter contained items not included in the former. He testified that for comparable items, his offer was $19,628,346 under the Myers offer and that, while the common stock would have received at least its $10 per share par value under his plan, it would receive $18 under the Myers proposal.

In an effort to iron out the countless controversies surrounding the deal, a test suit will be instituted, upon agreement between Attorney General Smith Troy at Olympia and Harold Shefelman, PUD general counsel. The case probably will be based on legality of one county's acting as agent for the others in making the purchase.

● A $91,000 CLAIM was paid on a surety bond last week to Bonneville Power Administration and other firms for the failure of Enterprise Electric Co., of Maryland, to fulfill a transmission-line building contract The federal court settlement, made by Seaboard Surety Co., was distributed among 120 persons and firms through the utility's defaulting on line construction between Covington, Wash., and Grand Coulee Dam. Of the sum, the largest share, $23,600, went to Bonneville on basis of laborer wage claims entered.

New York Investors May Buy Wyoming Company

Details of a plan to purchase Western Pacific Service Co., Laramie, Wyo., were announced recently by a group of New York investors. W. C. Gilman, a representative of the group, told SEC that the purchase plan would involve $843,000 for Western's 15,000 shares of $40 par value capital stock, plus a $508,000 demand note to the parent, Engineers Public Service Co.

Financing for outright purchase would necessitate an outlay of about $405,000, Gilman told the commission, which would be met jointly by Charles Merrill, senior partner of Merrill, Lynch, Pierce, Fenner & Beane, representing a Merrill trust, H. C. Gayley, Gilman, R. G. Smith, and G. L. Augustus.

Following the purchase, Gilman indicated that $800,000 of 3½% 25-year mortgage bonds and $200,000 of 3½% ten-year serial notes would be issued by Western. The notes would be retained for the first ten years and a sinking fund established for the bonds, which would be payable at ½ of 1%, in cash or property. During the next 15 years, they would be payable at 2% in cash.

It was announced that William Breslin, president of Western, will retain his position following the sale. Plans are under way for a 50-mile extension of transmission lines north and west of Laramie, in communities not now served.

● RAFT RIVER Rural Electric Co-op, Malta, Idaho, was granted $295,000 in REA funds.

PCEA CONVENTION

Pacific Coast Electrical Assn. will hold a convention, its first since the beginning of the war, at the Fairmount Hotel in San Francisco, June 12, 13, 14, President K. M. Ryals has announced.

COMPETITIVE BIDDING LAW MAY BLOCK UTILITY SALE

First utility to feel the teeth in California Railroad Commission's recent ruling on competitive bidding is the California Pacific Utilities Co., which may be checked in its move to acquire the properties of Eastern Oregon Light & Power Co.

During California Pacific's negotiations to purchase the Oregon utility, the commission placed in effect on Feb. 4 an order requiring all California public utility corporations to accept written sealed bids in cases of financing both new and refunding issues of over $1,000,000. The purchase price of Eastern Oregon Light & Power is reported to be under $2,300,000.

At the same time, California Pacific had entered into an agreement with First California Co. as underwriter for private sale of a bond and common stock issue.

In an attempt to accomplish the purchase, California Pacific has protested that its negotiations have been under way for several months, but that its projected financing procedures can not be finished by the date upon which the commission's new order goes into effect. Also, the company has asked exemption from the ruling on grounds that its proposed $1,375,000 issue of bonds would almost redeem the $1,800,000 of Eastern Oregon Light & Power bonds which it would have to assume, suggesting that the remaining amount could be considered low enough by the commission to allow the transaction to go through.

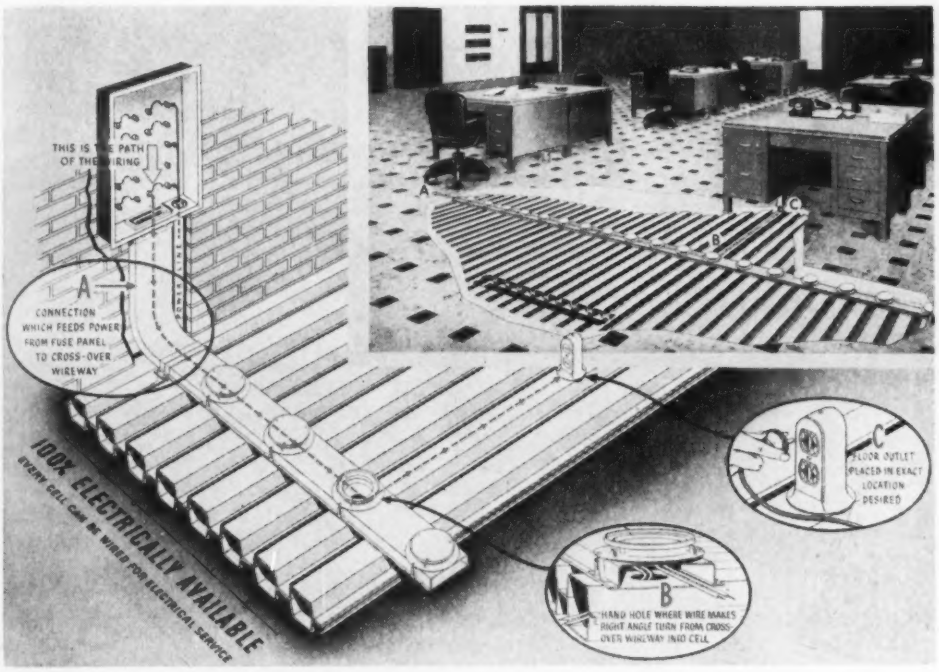
Commission authorities will give a decision on the matter following action by the Oregon State Utilities Commission to the pending application by Eastern Oregon Light & Power for surrender of its properties.

Meanwhile, as another barrier to the sale, Union County (Ore.) PUD is contesting the move, objecting that Eastern Oregon Light & Power failed to notify the PUD that a purchase agreement had been reached with California Pacific. The PUD has requested a commission hearing and has indicated that, if it cannot buy the Eastern Oregon properties, it will construct its own system.

● REDDING, Calif., has announced electric rate reductions, following its acceptance of a five-year contract with Pacific Gas and Electric Co., lowering the wholesale power cost. Over-all cut will be about 10%.

ELECTRICAL OUTLETS WHEREVER YOU WANT THEM

UTMOST ELECTRICAL ADEQUACY IS PROVIDED WITH G.E. Q-FLOOR WIRING AND ROBERTSON Q-FLOORS


THIS IS THE PATH OF THE WIRING
A
CONNECTION WHICH FEEDS POWER FROM FUSE PANEL TO CROSS-OVER WIREWAY
100% ELECTRICALLY AVAILABLE
EVERY CELL CAN BE WIRED FOR ELECTRICAL SERVICE
B
HAND HOLE WHERE WIRE MAKES RIGHT ANGLE TURN FROM CROSS-OVER WIREWAY INTO CELL
C
FLOOR OUTLET PLACED IN EXACT LOCATION DESIRED

G.E. Q-FLOOR WIRING is a system of header ducts and fittings for the purpose of drawing wires from a central point such as a cabinet, panelboard or substation to outlets anywhere in the entire floor area. It makes floor space extremely flexible. Factory machines, office desks, store displays can be moved around at will with electric and phone outlets always available.

Q-FLOORS CONSIST of cellular steel sections of varying types, lengths and guages which are placed on any type of structural frame and secured by welding. They more than meet every structural requirement and have 4-hour fire rating by Underwriters' Laboratories, Inc. Call your nearest G. E. Supply office for full information.

AS SHOWN ABOVE every cell of this floor (on six inch centers) can be wired for electrical service. The standard floor header duct is installed anyplace desired on the floor area at right angles to the run of the floor cells. A separate header duct is used for each electrical or phone system. "A" is the ell which connects header duct to panel box. "B" is a junction unit, where wires make a right angle turn from header duct into floor cell. "C" is the floor outlet, placed exactly where desired. The header duct provides 6.38 square inches of cross-sectional area.

CONSIDER THESE building advantages: 1) Saves construction time. Two men (top right) can lay a 32 square foot section in 30 seconds. No waiting for wet materials to dry. 2) Q-Floors provide a safe, solid working and storage platform for other building trades (lower right). 3) Permits clean, dry construction. No floor forms required. No temporary planting needed. No fire hazards. 4) Remarkably light construction. Can be applied to any type of building.

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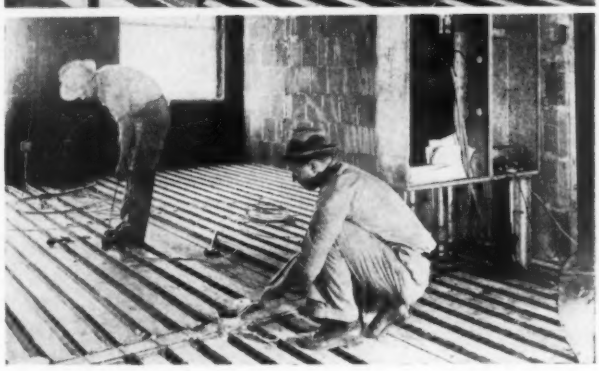

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US	—Fiberduct —EMT flexible metal conduit —Weatherproof sockets
ABOUT	—Our complete line of building wires, conduits and wire devices.

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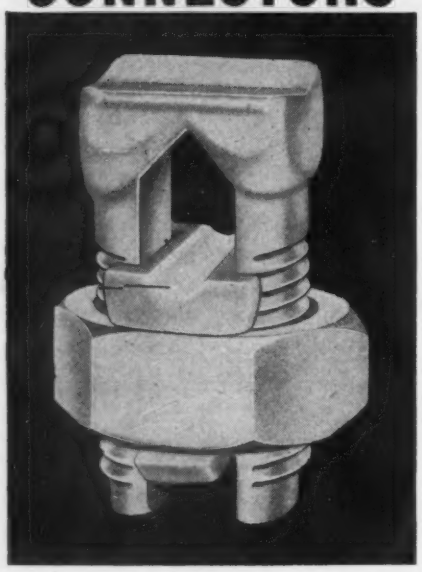

High strength materials and close tolerances of all parts make these connectors exceptionally strong. They will accommodate two or more copper wires from 10 solid or smaller to 1000 MCM strand inclusive. Connectors up to 1/0 strand inclusive, have pure cold forged bolts and clamping jaws and nuts are of 98% copper content hard metal alloy. The 2/0 and 4/0 connectors have machined bolts and nuts of 95% copper content high tensile strength alloy. Connectors for 350 to 1000 MCM strand are of cast hard durable alloy having high conductivity.

Plated connectors for aluminum or steel wires and with bimetallic washers for connection with copper wires are also available.

Nut retainers can be furnished on connectors for 6 solid wire to 1/0 strand inclusive.

Write for Bulletin 206

W. N. MATTHEWS CORP.
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CITY DROPS OUT OF PUD; WILL FORM OWN SYSTEM

Toledo, Ore. will cut loose from Central Lincoln PUD and establish a municipally owned power and lighting system, the city announced recently. Toledo, county seat, has been in the PUD since 1942, when the district acquired properties of West Coast Power Co.

"Poor service, PUD politics and unfilled promises of lower rates and adequate service" caused the action, according to Earl Conrad, Toledo city attorney, who in a letter to the PUD asked the price at which the city may purchase distribution lines. If the PUD does not wish to sell, Conrad said, the city will build its own transmission lines.

In 1944 the cities of Toledo and Reedsport, which provided approximately one-half of the revenue of the district, voted to withdraw from the PUD, although they continued to purchase power from it. Now Toledo proposes to make the separation complete by purchasing current direct from Bonneville.

Until Bonneville's new power line from the Albany substation to Toledo is completed this summer, Toledo proposes to buy power direct from the C. D. Johnson Lumber Co. at Toledo, which is now selling current to the PUD.

PGE Withdraws Appeal in Clark County PUD Case

Portland General Electric Co. has withdrawn its appeal filed in the United States circuit court of appeals at San Francisco, in the sale of its Clark County, Wash., properties to the PUD for $801,000. This action terminates all litigation with respect to acquisition by the district of the company's holdings in Vancouver, Wash., and adjacent territory.

The PUD and Portland General Electric each had submitted claims as to valuation in a jury hearing in United States district court at Tacoma, the jury fixing the valuation at $801,000. The PUD paid the purchase price and took over operation of the former PGE properties Jan. 10.

Oregon Counties Continue Efforts to Form Districts

Residents of Harney County, Ore., recently filed a petition with the state hydroelectric commission for permission to organize a PUD. The area, including Burns and Hines, is 433 square miles in size, with a population of 3,400 and an assessed valuation of $4,254,000.

Marion County residents, also seeking to form a PUD, held a sectional discussion meeting at Silverton, to discuss procedure. The area, which is 824 square miles, would not include the city of Salem.

Washington PUD Seeking Hydroelectric Permit

Clallam County (Wash.) PUD has applied for a 36-month preliminary permit for a hydroelectric development to be located near Forks, Wash., on the Hoh River.

The proposed development would consist of a masonry or rock-filled dam 150-ft. above low-water stage. It would be on the upstream side of Ox Bow Bend and have a power house with 32,000 kw. of installed generating capacity. The power house, some distance from the dam, would be fed through a steel penstock.

A preliminary permit would only maintain priority of application and would not authorize any actual construction on U. S. lands.

● OREGON state hydroelectric commission has declared feasible the proposed Malheur County PUD, which includes the cities of Ontario, Vale and Nyssa. The district has a population of 19,263 and an assessed valuation of $10,527,953. The 4,937 electric consumers in the district are served almost entirely by the Idaho Power Co., only a small number being served by the Malheur Cooperative Electric Assn. An election on creating the district will be held within the next few months.

● E. B. HEIMBACH and H. M. BRITTON, experts of the staff of the American Appraisal Company, Milwaukee, are in British Columbia to evaluate power companies taken over last year by the B. C. Power Commission. They will appraise Nanaimo-Duncan Utilities Ltd., West Canadian Hydro Corp. and Columbia Power Co. Ltd., setting prices to be paid by the commission for the properties. Should the recommended prices not be acceptable to the companies, arbitration in the courts will follow.

● ACTION of the West Salem (Ore.) city council in awarding Salem Electric Cooperative a five-year franchise, while tabling the company's franchise request was protested last month by Portland General Electric Co. In 1939 PGE was refused renewal of its franchise in West Salem, only municipality in which the company is operating without franchise. The company probably will ask for a franchise election.

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NEW MEXICO UTILITY SALE HAS COMMISSION APPROVAL

Purchase of the New Mexico Electric Service Co. by New Mexico Electric Service Corp. for $1,222,537 has been approved by the State Public Service Commission.

The utility had been purchased previously by J. F. Maddox, James M. Murray Jr., and Dwight P. Teed from American Power and Light, after a 1942 securities and exchange commission order that the parent company divest itself of the properties.

In addition to the order, which approved purchase of all common capital and outstanding securities of the company, authorization was given the corporation to issue 3½% first mortgage bonds to the amount of $700,000, and 3½% second mortgage promisory notes to the amount of $306,000.

Arizona Power Needs Eyed in Colorado River Basin Study

A survey of the Colorado River basin which will lend special attention to future loads and power needs of Arizona has been started by representatives of the Federal Power Commission, working in cooperation with the Arizona Power Authority.

The survey will consider Arizona power needs with particular respect to Davis Dam, in recognition of the fact that power demands in the state are multiplying rapidly in spite of reduction of power to war plant declared surplus.

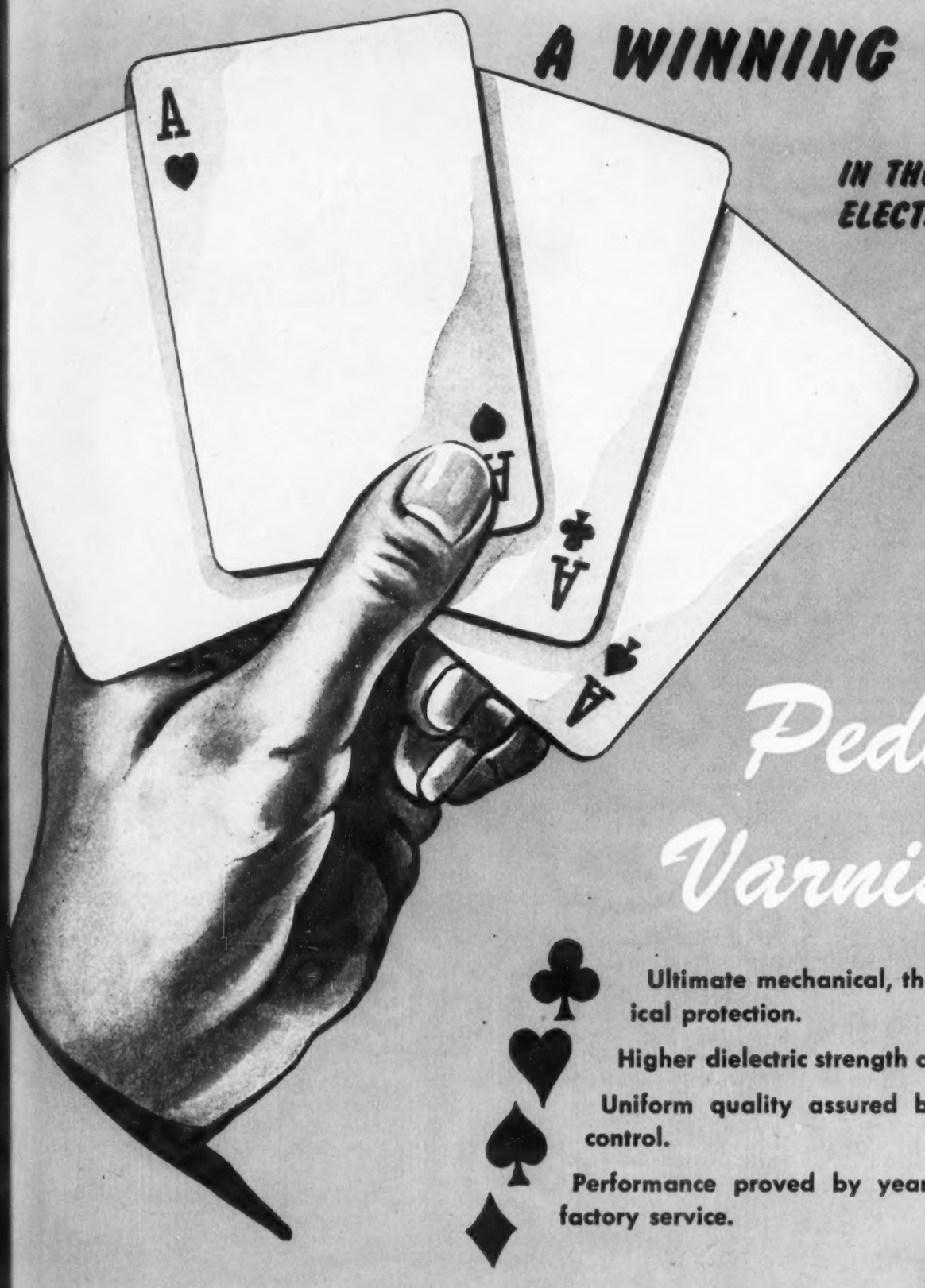
Arizona Power Authority acts as negotiary with the federal government on distribution of Colorado River energy, as well as authorizing arrangements concerning transmission lines and facilities to sell river power to Arizona and public utilities.

● CALIFORNIA Railroad Commission approval has been granted for purchase of Sierra City Light & Power Co. by Pacific Gas and Electric. The new system will be connected with PG and E's network by extending a line from Downieville to Sierra City. PG and E also has bought Poverty Hill Partnership line, 16 miles long, extending from Pike City to Poverty Hill Mine, which will serve the Calida Lumber Co. green lumber mill.

● PACIFIC POWER & LIGHT Co.'s "fight waste" advertisement aiding the government conservation program was selected by the War Advertising Council, N. Y., as one of the 100 outstanding wartime advertisements of the past year.

A WINNING HAND

IN THE ELECTRICAL GAME



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IDAHO POWER ACQUIRES ANOTHER REA CO-OP

Idaho Power Co. has assumed ownership of the Long Valley Power Cooperative Inc., Donnelly, Idaho, second REA co-op to sell to the company in recent months.

At a membership meeting held at Donnelly Jan. 28, the vote of the membership was 273 to 5 to sell the system. A two-thirds favorable vote was necessary to assure the transaction.

C. J. Strike, president of Idaho Power, explained to the members that the company's offer — approximately $200,000—was submitted at the request of co-op officials, and that the sum would allow payment of all indebtedness of the association, including its loan from the federal government and to refund all membership fees and consumer deposits.

The Long Valley system has been in operation four years and serves 416 customers. Power company officials said that co-op power users would be transferred immediately to the utility's standard rates for the area, which were said to be about 33% lower than those of the co-op.

J. W. Crowe, Boise division manager for the company, announced that line extensions to new farms in the area will be constructed as soon as weather conditions permit and materials can be obtained.

Utah Power purchased the facilities of the Jordan Valley (Ore.) Electric Cooperative last November.

Hold the Line Advice Given Co-ops at Boise Meeting

Accusing Idaho Power Co of a "vigorous campaign" to encourage sale of cooperative systems to priyate ownership, nine REA systems have banded together to resist the efforts of power companies to buy out and destroy cooperatives.

Among those urging cooperatives to "hold the line" at a meeting in Boise were Charles Samenow of the REA, M. J. Martz, assistant power engineer in the USBR office at Boise, who stated that potential power developments from Idaho streams is 2,000,000 kw.; Henry Alderman, Bonneville, who declared his agency interested in furnishing transmission facilities for reclamation projects; Glen Bell, manager of Bonneville's upper Columbia district.

A letter from REA Administrator Claude Wickard said that "plans of the Reclamation Bureau and Bonneville Administration to make an abundance of public power available in Idaho at extremely low wholesale rates give REA cooperatives of the state an opportunity to be of still greater service to the state at large."

In a prepared statement, Idaho Power President C. J. Strike said his company has not sought to purchase farm electric systems owned by local farmers and financed by the national REA; that Idaho Power has met power requirements of the whole area, including agricultural requirements, and intends to continue doing so.

Salt Lake Court Surrenders Control of Utility Assets

After receiving affidavits and testimony showing that Utah Power & Light Co. had carried out all provisions necessary to its reorganization plan, the federal district court in Salt Lake City last month signed an order surrendering its jurisdiction of the company's assets.

Judge Tillman D. Johnson had taken formal control when the court approved a request of the Securities and Exchange Commission that the company cease to be financially connected with Electric Power & Light Corp. and Electric Bond & Share.

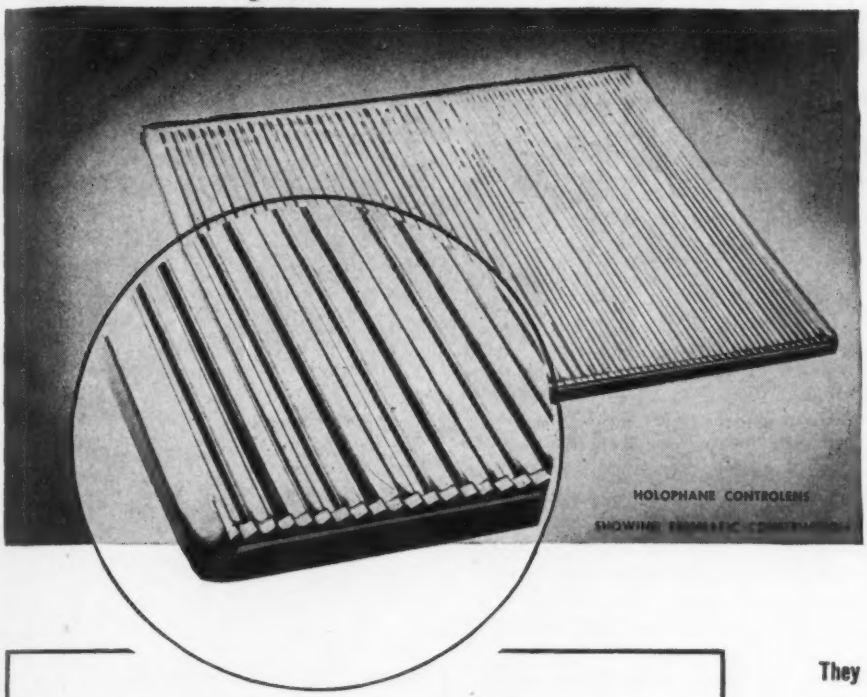
PG and E Rate Cuts Total $7,490,000 Within Year

A cut in Pacific Gas and Electric power rates totaling $3,310,000 annually has been approved by the California Railroad Commission. This is in addition to a $3,500,000 reduction in gas rates and military and wholesale rate reductions amounting to $680,000. The total of $7,490,000, granted within less than a year, is the largest reduction ever made by one company in California within the same period, the commission said.

Of the total electric rate reduction, $1,150,000 will go to domestic users, $1,430,000 to commercial, $505,000 to agricultural power users and $225,000 to general power service. Most of the new schedules will be effective April 15.

● FPC last month announced its findings on original cost of Pacific Power & Light Co.'s Cove hydroelectric development. The commission allowed $296,348 as legitimate cost as of Oct. 4, 1938, effective date of the license, and disallowed $7,028 of the $303,376 claimed by the company. No action has been taken on estimated accrued depreciation totaling $67,940. The development, originally constructed in 1915 under permit to Deschutes Power Co., is located on the Crooked River in Oregon and has an installed capacity of 1,500 hp.

Specify *CONTROLESCENT LUMINAIRES



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Day-Brite Lighting Inc.
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The Frink Corp.
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Gotham Lighting Corp.
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New York 11, N. Y.

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Grand Rapids
Michigan

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Chicago 12, Ill.

Hy-Lite Corp.
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McPhilben Mfg. Co.
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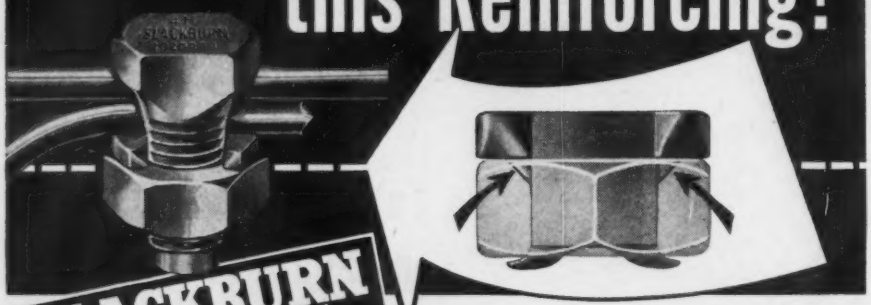

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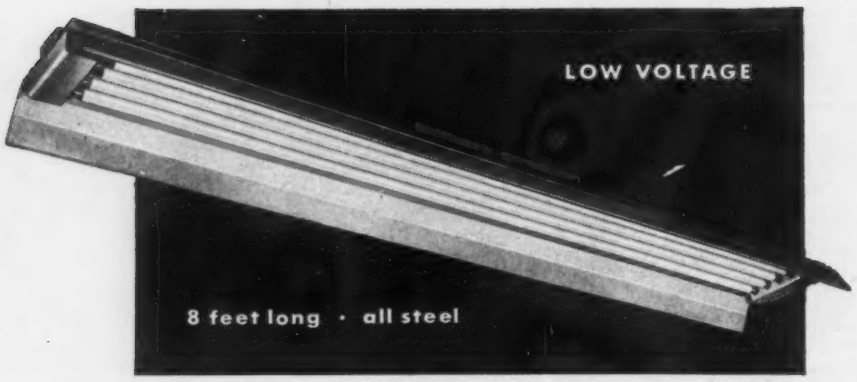
*COLOVOLT COLD CATHODE INDUSTRIAL FIXTURES.



Here is the new Colovolt industrial fixture, one of a complete line of industrial and commercial "packaged" units. Equipped with the standard 93" Colovolt 10,000 hour lamp, Colovolt fixtures may be used singly or in continuous line lighting in multiples of 8 feet. Instantaneous starting, no flickering, guaranteed for 1 year except for failure due to breakage are extra advantages of the Colovolt Cold Cathode low voltage fluorescent lamp. The long life expectancy of Colovolt lamps may be realized even when constantly turned on and off, and *pre-scheduled re-lamping, with no loss of production or time, is now possible with Colovolt installations.*

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BONNEVILLE REPORTS ON COLUMBIA RIVER SALES

With 8,513,125,169 kwh. delivered during the fiscal year 1945, Bonneville Power Administration revenues totaled $22,990,018 for the period, according to the annual report released by Dr. Paul J. Raver, administrator. The year's operations brought revenues of the administration, as marketing agent for Bonneville and Grand Coulee power, to a total of $63,577,242, with total energy deliveries of 25,979,057,078 kwh.

Of total revenues to June 30, 1945, $36,188,589 came from sales of power to the light metals industry; $8,299,162 from sales to other industries; $1,057,801, military establishments; $5,910,277, publicly owned utilities; $11,904,555, power companies; $216,860, other sources.

Installed capacity at Grand Coulee and Bonneville at the close of the year was 1,326,400 kw.

Bonneville Rate Structure Subject of Two Reports

Released last month and sent to Representative Walter Horan at his request were two reports on the Bonneville rate structure.

The reports, which covered the $17.50 per kilowatt-year basic rate structure, included a study by the public accounting firm, Arthur Andersen & Co. and a study of the pay out structure of the Columbia Basin projects based on current government wholesale power rates. The latter, according to Administrator Paul J. Raver, was made in conjunction with present discussions of the adequacy of the Bonneville rate in paying off the federal investment in the projects.

Shown in the audit were accumulated net revenues at the end of the last fiscal year of $11,572,052 over costs of power operations, including interest and depreciation, Raver pointed out.

Revenues from sale of Bonneville and Grand Coulee power are required to pay (1) $58,708,309 of the estimated $85,610,872 cost of Bonneville Dam, (2) all of the cost of the Bonneville-Grand Coulee transmission system, representing current investment of $82,486,994 and an estimated completed investment of $168,332,747, and (3) $382,547,068 of the $506,459,180 estimated ultimate cost of the Columbia Basin project. The total project figure includes irrigation costs to be repaid by power revenues and $35,519,577 for river regulation benefits to future downstream hydroelectric plants.

"If a line's worth building, it's worth building right!"

"Right" means a lot of things, when you're talking about a power line, sound engineering to assure maximum service with a minimum of maintenance—quality materials, with the same purpose—ample capacity for future growth of loads.

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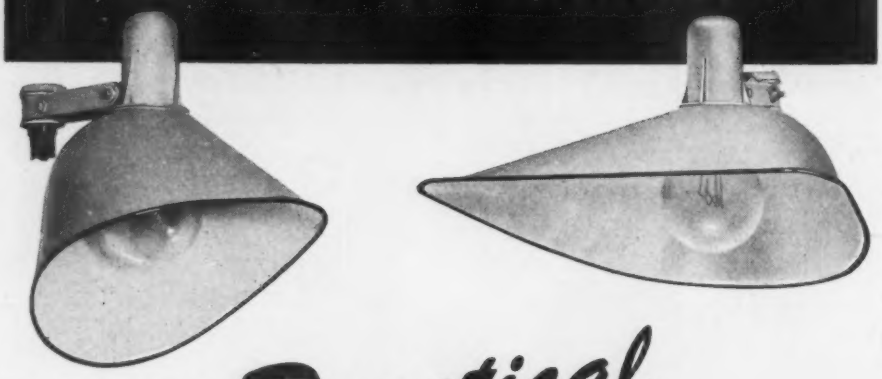

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NEVADA APPLICATION IN FOR DAVIS DAM POWER

Although Davis Dam will not be completed for from three to four years, the Nevada Colorado River Commission has placed on file an application for a power allotment from the Clark County, Nev., project.

Submitted to the department of interior, the application calls for 45,000 kw. and for 200,000,000 kwh. annually for exclusive Nevada use.

The action was taken at a recent commissioner's meeting in Reno, at which a reduction was also voted in the administrative charge to the Nevada Power Contractors, resulting from a condition of accumulated reserve in the commission fund.

A drop in levy from .3 of a mill per kwh. to .1 of a mill will allow funds, operating records indicated, for current operating expenses and to preserve also an existent reserve fund. Previously the administrative charge, in addition to furnishing operating expenses and the creation of a reserve, had been sufficient to repay $25,000 to the state which had been appropriated at the time of the creation of the commission.

● USBR branch of design and construction in Denver needs 2,250 new engineers and engineering aides to meet staff requirements of 3,200 by July 1, it was announced by the bureau in February. Particularly needed at present are civil, electrical, mechanical and structural engineers. While veterans are given preference in civil service appointment, applications will be accepted from the public at large, selection being on the basis of experience and training, not by written examination. Salaries for engineers range from $2,320 to $5,180 per year; for engineering aides from $1,572 to $2,980.

● H. H. WALKER Inc. of Los Angeles submitted the low bid of $69,932 for Bonneville's 40-mile, 115,00-volt Albany-Toledo (Ore.) transmission line. About 65% of clearance work has been completed on the right-of-way, under a contract let to E. C. Thompson, San Francisco. Construction contract calls for an H-frame, wood pole line. Material will be furnished by Bonneville.

● BONNEVILLE Power Administration will construct a 69,000-volt transmission line from its Walla Walla-Pendleton line to a new substation to be built near Milton, Ore., as soon as labor and material can be obtained. The line will be approximately five miles long and will be of wood pole construction.

THE PRESIDENT'S WAGE-PRICE POLICY WON'T WORK

THE AMERICAN public had every right to expect that the long-awaited wage and price policy would break the impasse blocking the way to the swift and orderly reconversion of industry from war to peace.

The policy announced offers little promise of such solution, and this may well constitute a national calamity.

There is only one thoroughly constructive feature of the Presidential Statement of February 14 and its implementing Executive Order. It is the first Government pronouncement since the defeat of Japan to clearly define inflation as the major danger confronting us in the period immediately ahead.

That is a correct appraisal, and one long overdue. Up to now Government spokesmen, almost invariably, have sought to carry water on both shoulders. The Administration has justified its policy of promoting wage increases as a measure necessary to forestall deflation — to keep purchasing power from falling and forcing the economy into a violent tailspin. The strict holding-of-the-line on price ceilings has been defended as necessary to prevent runaway inflation. Unfortunately, while the President now exhorts all to enlist in a crusade against inflation with a voice that is clearly Jacob's, his program for dealing with it still employs the hairy hands of Esau to promote the very danger which he is urging everyone else to combat.

The "new" policy provides for a continuation of the wage increases that have been pressured through by Government mediators, "fact-finding" boards, and direct seizures until they have been made general throughout industry upon the dimension established in recent patterns. It offers industry the single concession of prompt hearings and decisions upon claims for price advances, but the yardsticks for judging such claims are exactly those which OPA has applied in the past. Since the past procedure has led us into our present difficulties, it is hard to see how it will serve now to lead us out of them.

Past Government Policy Fostered Dissension

At the war's end, it was obvious to everyone that what was needed was the swiftest possible reconversion of industry. It should have been equally apparent that we were faced with the difficult problem of controlling tremendous inflationary pressures which would be particularly insistent until peacetime production could be mobilized at high volume. This was made almost inevitable by the huge backlog of accumulated demand, for both capital and consumer goods, and by the unprecedented volume of liquid funds at the disposal of individuals of all classes. The only circumstance that could have modified the inflationary complexion of the postwar picture was the possibility of such wholesale and prolonged dislocation and unemployment in the process of readjustment that people would have been frightened into freezing onto their savings instead of spending them.

It soon was apparent that just the opposite was taking place. The early transition was extraordinarily swift, unemployment was lower than anyone had dared hope, and civilian spending outstripped all previous records. The circumstances called for strong anti-inflationary fiscal measures, along with a firm maintenance of price and wage controls alike.

Instead of adopting such a balanced program, the Government immediately discarded all wage controls, and in addition started an active campaign for promoting large wage increases. The President, upon a number of occasions stated flatly that American industry generally could and should grant substantial pay advances without any compensating price rises. His Office of War Mobilization and Reconversion estimated that average increases were practicable to the extent of 24 per cent. Given such Governmental encouragement, it was inevitable that labor leaders should do exactly what they did—file extravagant wage demands at the beginning of the reconversion process, when accurate appraisal of production schedules and costs were least susceptible of calculation, and when the shortage of civilian goods multiplied the inflationary effect of any increase in purchasing power.

At the same time, the OPA was fighting to hold the price line in a good cause, but with singularly inept procedure. It acted, seemingly, upon the premise that it was always better to give less price relief than was needed rather than enough, that relief provided under its formula was preferably to be granted later rather than on time, and that the interests of lower-bracket income receivers should be protected by a particularly tough resistance to raising prices of cheaper goods. The latter procedure seems to have boomeranged by virtually driving many of the lower-priced lines off the market.

The sum of these wage-price procedures resulted in work-stoppages of epidemic scope. Many business concerns faced with the prospect of immediately unprofitable operation, uncertain that new wage demands would not be made with Government support as soon as volume production was established, and without assurance as to when price controls would end, refused to assume inevitable losses even when confronted with combined union and Government pressure. The fight was on.

"New" Policy Differs Little From Old

With inflation now clearly recognized as the immediate danger, it might have been expected that the new wage policy would reverse the former practise of lending active encouragement to new wage advances. But that would have brought down upon the Administration the wrath of all organized workers who had not yet been granted increases already bargained through by other groups. This was avoided by directing the National Wage Stabilization Board in effect to approve any wage increases necessary to give general advances comparable to those already made. The only brake applied on the wage side lies in a directive to the Board not to approve, as a basis

for price relief, wage advances that go beyond the established pattern.

On the price side, the new directives to the OPA entail no important departure from its past procedures. Even the concession to review "hardship" cases promptly rather than after six months is only a pious hope, since it is unlikely that OPA is equipped to deal rapidly with the thousands of cases that will arise. A hardship case is defined as one in which, after absorbing an approved wage advance, an industry or establishment in a twelve months' period of normal-rate operation is judged by the Price Administrator likely to operate at a rate of profits to net worth less than it averaged in the base period of 1936-1939.

Let us see what this really means. In the first place, the rate of manufacturing profits in the base period was only moderate. But since the average net worth of manufacturing corporations has increased one-third over what it was in the base period, the application of the OPA formula, *assuming that its Administrator correctly appraises the twelve-month outlook,* seems to provide for absolute profits one-third higher than the 1936-1939 average.

The OPA formula, however, applies to profits *before taxes.* What really matters to stockholders is profits *after taxes.* Corporation taxes have been increased from an average of 17 per cent in the base period to 38 per cent now. This means that the price adjustments granted by OPA on average will yield profits *after taxes* no larger in dollar terms than in the 1936-1939 period, although 1946 manufacturing sales are expected to be more than twice as high. Under this procedure the *ratio* to net worth of profits *after taxes* will be one-fourth lower than the 1936-39 average. This clearly undermines the incentives upon which production at high level depends.

The workers get wage increases which promote inflation. The Government, bailed out from its previous mistakes, gets political credit for raising wages. And the entire bill is handed to American industry for payment.

But the Danger of Inflation is Real

Under these circumstances, there is a growing demand on the part of business groups that price controls be rescinded immediately. It is argued that, once the restrictive influence of price controls is relaxed, capacity production soon will supply sufficient goods to prevent undue price inflation.

It is understandable that business should wish to be rid of Government controls which have operated in such a thoroughly inconsistent and damaging fashion. Unfortunately, there is ground for believing that more harm might result from this cure than from the disease.

There is nothing in our situation that could bring on the kind of inflation that has been experienced by certain countries of Europe and Asia — in which the value of currency deteriorates until it takes a cartload to buy a pair of shoes. But our situation now is definitely more threatening than it was in 1919, after the first World War. At that time wholesale prices and the cost-of-living skyrocketed almost 25 per cent within twelve months. If we discard all controls now, as we did then, prices might easily go up from 25 to 50 per cent in a year's time.

An inflation of that dimension can do tremendous damage. While it lasts, all those dependent upon fixed incomes are damaged — all bondholders, including those who hold war bonds, all life insurance and annuity beneficiaries, all pensioners. Generally, the purchasing power of wages and salaries would shrink, with white collar and unorganized production workers hardest hit. Controlled-rate industries, such as railways and other utilities, would be squeezed. General business would suffer least of all — while the boom lasted.

But such soaring booms cannot last. The 1919 boom burst in mid-1920. By summer of 1921 industrial prices had fallen 40 per cent and industrial production was off 35 per cent; farm prices had fallen 50 per cent. This time the boom might soar higher and last longer, but that would merely result in an even more precipitous drop. Business would be hard hit along with everyone else, and high wage rates would mean nothing to the unemployed.

Controls Must be Consistent and Progressively Relaxed

But if the Nation cannot afford to risk disastrous inflation by immediately abolishing controls, neither can business afford to accept the program which the Administration now proposes.

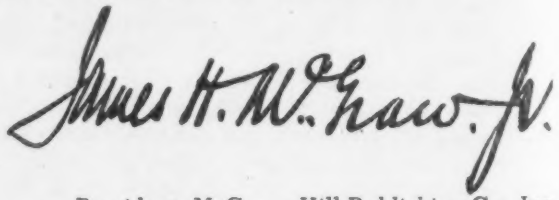
The wage-price policy will not hold the inflation line so long as the Administration is leading the assault to breach that line on the wage side, as it has done ever since VJ-Day.

The Administration is now going before Congress to ask for a broad extension of its wartime powers for an additional year beyond June, 1946.

Congress must see that this is not granted except upon terms that guarantee the use of such power with a consistency that has been conspicuously absent up to now.

1. It must provide sufficient price relief to yield profits normal to high-level operation.
2. The basis for price relief must be clearly defined and geared to actual costs of operation at the earliest possible date.
3. OPA administrative procedures must be speeded-up and streamlined, or the delays that characterized past administration will become intolerable.
4. It must see that, once established, the new line is held as long as wartime controls are continued by enforcing restrictions on wages as well as prices.
5. It must set an early date for the termination of all wartime controls and provide for progressive and bold steps for de-control to be taken before that date, as soon as production levels in any field are sufficiently high to restrain runaway prices.
6. It must proceed without delay to marshal fiscal and monetary policies to combat inflation, in order that price controls may be discarded at the earliest possible date.

Unless Congress does this — and it will not be easy in an election year — we are headed for an explosion. It will come in one of two forms — either in a continuance of industrial strife, or in a rocketing inflationary boom that can only end in collapse and depression.



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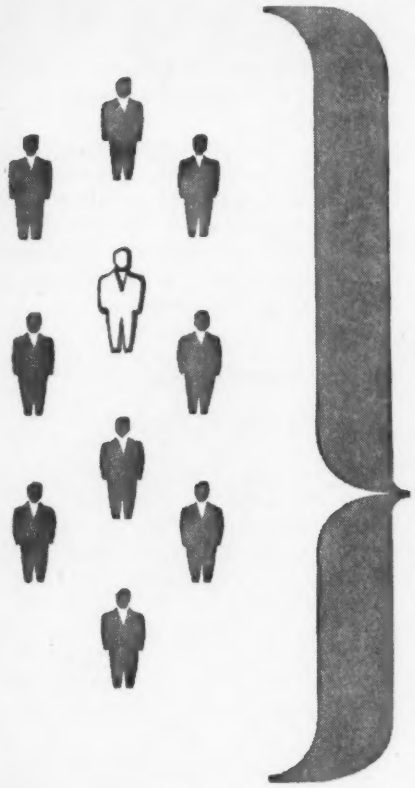

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Every employer can write in his own set of reasons why the Payroll Savings Plan should be continued as a part of his personnel relations program, but the principal advantages are obvious:

A large reservoir of national savings; a strong and stable bulwark against inflation.

An "automatic" thrift habit for the worker; to increase contentment and satisfaction in his job.

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BONNEVILLE WILL WHEEL ENERGY TO B. C. ELECTRIC

With right-of-way clearance for a new transmission line under way, Bonneville officials said in Seattle last month that the agency probably will begin wheeling power to B. C. Electric late this year. Through a power exchange agreement with Seattle City Light, Bonneville will send power through Seattle's 230-kv. system to serve the Canadian company.

The new line, some 71 miles long, extends northward from a switching station near Arlington, Wash., to the delivery point near Blaine. It will be routed through the vicinity of Sedro Wolley and Bellingham, passing to the north and east of Lake Whatcom.

Terminal facilities will include a deadend structure at the border for terminating both the Bonneville and BCE lines near Blaine, and a 230-kv. sectionalizing switch to facilitate location and repair of line damage. A temporary switching station also will be located near Arlington to connect the line to Seattle's 230-kv. system.

Bonneville officials said it is planned later to remove the temporary Arlington station and extend the Arlington line to a permanent 230-kv. substation to be built near Snohomish, Wash. Studies now under way will determine how this substation should be connected with Seattle's system and the BPA system.

Bonneville proposes to install metering equipment on the low-voltage side of the B. C. Electric transformer bank, though procedure is still being studied. Under this arrangement, losses would be computed back to the delivery point at the Canadian boundary.

Puget Sound Signs For Columbia River Power

Bonneville Power Administration and Puget Sound Power & Light Co. last month announced an arrangement under which Puget Power will receive a minimum of 85,000 kw. of Columbia River power for one year.

Since expiration on Oct. 31, 1944, of a previous contract, Bonneville had been selling power to the company on a day-to-day basis. The new contract, which is retroactive to October 1945, will be in effect until midnight Sept. 30, 1946, and provides additionally for purchase of dump energy by either party when available. During peak load periods, Puget Power is currently taking up to 130,000 kw. from the Bonneville-Grand Coulee system.

According to terms of the agreement, the company will transfer up to 1,500 kw. to Lewis County PUD and in return Bonneville will replace all energy transferred plus losses. It will also reimburse the company for direct expenses incurred in delivery to the PUD and in payment for use of facilities and rendering of the service.

● A Bid of $828,226.30 for equipment and installation of a second hydroelectric power generating unit at Fort Peck Dam, near Glasgow, Mont., has been submitted to the Omaha office of the U. S. Army Engineers. Lt. Col. H. H. Roberts, Fort Peck district engineer, said the bid, only one received, was submitted by Morrison-Knudsen Co., Inc., of Boise, Idaho, and included a turbine and generator for producing 15,000 kw. of power and concrete work in the main central shaft.

● USBR announced low bidders for construction of a 56-mile, 230-kv. transmission line from Oroville to Sacramento, Calif.: H. H. Walker Inc., Los Angeles, $281,760; Underground Construction Co., Oakland, $426,883; Stolte Inc., Oakland, $487,616. Upwards of 250 steel towers, four million pounds of structural steel and more than 1,500 cu. yd. of concrete will be used in construction, the government to furnish all materials.

"Gene" Braun Welcomed Back to Job at M & H

After More than Three Years Military Service, Major Braun is Back at the General Offices on Eleventh Street, San Francisco

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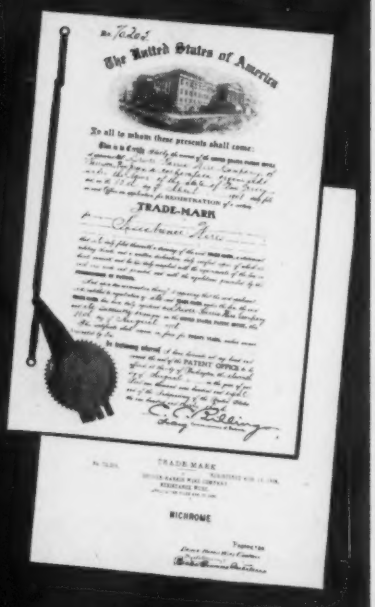

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● RESIGNATION of PRESIDENT A. B. WEST and SENIOR VICE-PRESIDENT F. O. DOLSON and appointment of ALBERT G. CAGE to succeed West was announced last month by California Electric Power Co. West and Dolson will remain on the board of directors. West has been with the company 38 years and had been president since 1936. Dolson joined the company in 1917 and became senior vice-president in 1943. Cage, who had been vice-president and general manager, started with

Cage

the company as a clerk in 1914, took time out to serve in World War 1, returned to the company in the commercial department, becoming assistant general agent in 1922, assistant general manager in 1932, vice-president and general manager in 1943.

● CARL C. ERNST, formerly assistant general manager of California Electric Power Co., will succeed Cage as vice-president and general manager.

● MAJOR EUGENE BRAUN, now on terminal leave from the U. S. Army, has returned to Maydwell & Hartzell, where he will resume the post of vice-president and general service manager for the Pacific Coast organization. During the war, Major Braun, a member of the Signal Corps, spent more than three years on the staff of the San Francisco Port of Embarkation, and served both at the Oakland Army Base and at Fort Mason. He has been associated with H. F. Hartzell since before the founding of the present company in 1923.

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Youngstown's BUCKEYE CONDUIT is easy to handle and install. In the hands of experienced men, it can be compactly installed within normal walls and floors, so that it requires no extra space. Hidden from sight it still provides a quick, safe method for enlarging or changing wiring systems at any future time.

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● JAMES S. MOULTON was named Pacific Gas and Electric Co. executive engineer last month to assume the engineering duties of the late W. G. Vincent, vice-president and executive engineer. A graduate of Yale University's Sheffield Scientific School in 1920, Moulton was successively a member of the San Joaquin Light & Power Corp. operating department, executive engineer for Great Western Power Co. and, from 1930 to 1940, assistant to the vice-president and general manager of PG and E. In 1940 he was transferred to the executive engineer's department, which he left in 1942 to join the armed forces. He was released from the Navy recently with the rank of commander.

Moulton

● BURTON R. COLE, formerly with Graybar in Seattle, has taken over duties of communications sales manager for the company in New York City. During the war, Cole served on a tour of duty with the Army Signal Corps, as U. S. Shipping Board radio operator and as radio installation engineer. At Seattle, he was manager of the Graybar lamp, lighting and supply departments.

● A. F. MORAIRTY will resign in March as vice-president and assistant general manager of Central Arizona Light & Power Co., but will continue with the organization as special assistant to President E. H. Coe. Morairty started with the company 20 years ago, as sales manager. His new responsibilities will include handling industrial programs in the Phoenix area.

● D. J. CALLAGHAN JR. of the PG and E general sales department has been appointed by California Governor Earl Warren to the state's Veteran Welfare Board. He recently was discharged from the Navy with the rank of lieutenant commander.

● APPOINTMENT of WILLIAM B. KENNEDY as Sylvania's Pacific Coast field engineer was announced recently by George R. Sommers, Pacific Coast manager. Kennedy had been commercial engineer for the company in Salem, Mass.

● ELDON E. BECK returned recently to his post as safety director of the Idaho Power Co., after completing a government assignment to do safety work at the atomic bomb project near Santa Fe, N. M.

● BENJAMIN C. HILL, chief of the Oakland, Calif., electrical department, retired Feb. 26, after 34 years of service in the department. He served 26 years as chief inspector and seven as superintendent. A past president of the Southwestern Section of the International Association of Electrical Inspectors and of the East Bay Electric Club, he will become president of the IAEI in April. He is also past chairman of the code and ordinance committee of the Pacific Coast Electrical Assn.

● H. R. CHRISTMAN has joined the Landers, Frary & Clark orgaization in northern California and will be in charge of sales of Universal major appliances. He has been engaged in sales work for a number of years and is well known in the territory. In his new position, he will have headquarters in San Francisco.

Christman

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CAST IRON BOXES • SOLDERLESS CONNECTORS

GROUNDING DEVICES • POWER CONNECTORS

. . . if they're O.Z.

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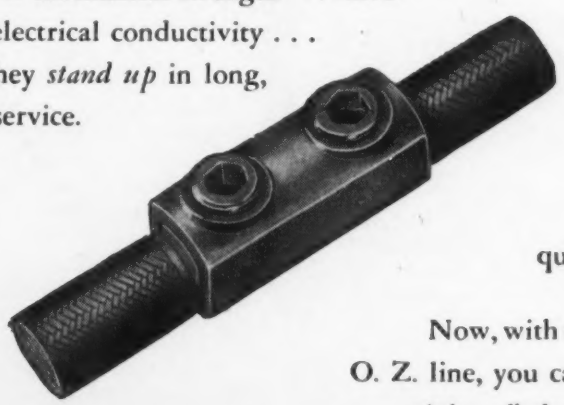

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Now, with more distributors handling the complete O. Z. line, you can get your O. Z. fittings in a hurry — right off the shelves of your local supplier.

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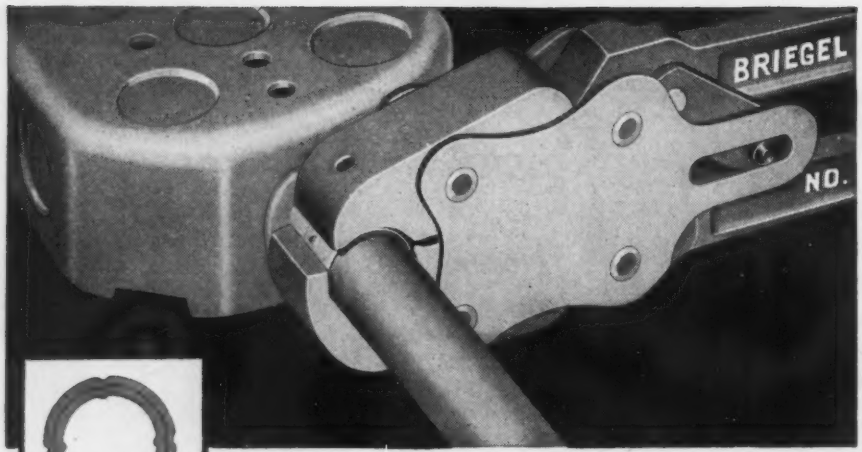

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Bost

● N. L. Bost, who completed three years of Army service in January, has resumed his sales activities in the Pacific Northwest for National Electric Products Corp. A veteran of World War 1, Bost was commissioned a captain on his re-enlistment in the Communications Service and later was promoted to major.

● Lt. Merrill J. Collett has joined the Bonneville Power Administration as director of personnel, coming there under special detail from the Navy pending his discharge. Before entering the service in 1943, he was field consultant for seven years with the public administration service in Chicago.

● E. O. Dilley has been appointed district manager at Vale, Ore., for the Idaho Power Co. Before his entry into military service in 1942, he was the company's manager at Huntington. H. W. Fish, former Vale district manager, will move to Boise to another assignment with Idaho Power.

● Lee D'Angelo returned Feb. 1 to his position as sales promotion manager for General Electric Supply in Los Angeles. He saw service in New Guinea, the Philippines and Japan; won the Bronze Star.

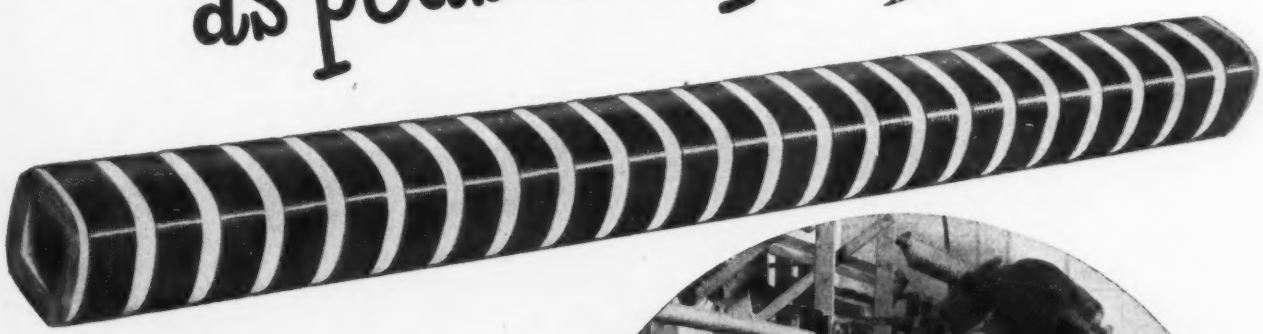
● George Mills has returned from military service and is territory representative for Leo J. Meyberg Co., at Los Angeles. Previous to joining the military in 1942, he was in the Meyberg Bendix division.

● A. U. Zimmerman, former district manager for California-Pacific Utilities Co. at Benicia, Calif., has been appointed manager of the Lassen district to succeed M. D. McKenzie.

ESSEX *EXTRA-TEST* MAGNET WIRE

Insures Multiple-Wound Coils

ALIKE as peas in a pod



Coil winding—particularly multiple (gang) layer-winding—demands wire uniformity to insure —

- Coils of uniform size and resistance value.
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Recently we completed a custom insulation job that called for uniformly extruding a cover .007 inches thick over 22 gauge wire.

This was tested dry, and after soaking in water, with currents up to 6000 volts without a breakdown in the insulation.

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RESINITE insulating tapes and tubing in stock sizes.

Send for booklet showing complete listings.

RESIN INDUSTRIES

SANTA BARBARA · CALIF

● FRANCIS H. FERGUSON, superintendent of light and power of Puget Sound Power & Light's Western division in Bremerton, the Puget Sound Navy Yard headquarters, has been transferred to Seattle where he becomes superintendent of light and power for the Central division. Born in Minnesota and an electrical engineering graduate from the University of Alberta, Ferguson joined Puget Power as a meter tester in 1923. In 1933, he became assistant superintendent of distribution, Central division, then superintendent in 1939. He went to Bremerton in 1942 as superintendent of light and power and stayed in the Western division throughout the war.

● ALBERT M. MCDONALD, superintendent of distribution in the Central division in Seattle since 1942, has replaced Ferguson as superintendent of light and power in Puget Power's Western division at Bremerton. McDonald started with the company as a lineman in 1925 at Everett, his home town. He was line foreman at Bremerton and then elevated to general foreman in 1937. In 1938, he was transferred to Puyallup as assistant superintendent of the company's Southern division. Four years later he was named superintendent of distribution, Central division.

● J. L. MARZLUFF, Puget Power transportation coordinator during the war, has been moved to the Northeastern division at Everett as superintendent of light and power. Marzluff has had a 33-year tenure with the company, starting as a lineman in Bellingham in 1912. Before becoming transportation coordinator, he was manager of the Renton and Winslow local offices. Later he was promoted to assistant superintendent of light and power at Bremerton.

● FRANK M. DREBICK has been appointed manager of Puget Power's Winslow branch office succeeding Harold Harmony. Debick, a Puget Power employee for more than 20 years, started as a wireman in 1925 with the People's Utility Co. in Rochester, Wash., moved to Montesano as a salesman. In 1932, he was advanced to special salesman in Chehalis, then transferred to Sumner in 1941, as an industrial consultant.

Boring

● CHARLES F. BORING has been named assistant to the general superintendent of operation for Puget Sound Power & Light. His headquarters will be in Seattle. For the past 14 years, Boring has been in Everett, first as assistant superintendent of light and power, then superintendent. He began as a meter reader with the Puget Sound Traction, Light & Power Co., forerunner of the present concern, in 1931.

● M. S. BARNES has been made assistant manager of the central station division of the G-E apparatus department at San Francisco.

Ferguson McDonald Marzluff

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Wherever there's a tough job of pole-setting or other construction or maintenance work . . . whenever line-trouble "pops", anywhere, far off the highway over rugged terrain or in muck . . . you can depend on FWDs to get men and equipment through to do the work.

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RENEWABLE FUSES

Here's a fuse that's DIFFERENT! The renewal element is custom-built and powder-packed—literally, "a fuse within a fuse". Only a "different" fuse can give you the following advantages:

- Tamperproof protection
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Write for Bulletin No. 1

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Used wherever cables are terminated.

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Used to make parallel taps, T-connections, cross-connections, or end-to-end connections.

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An inexpensive, efficient house service connector for attaching wires and cables on end.

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Connectors for Cable to Flat Bar.

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● I. E. McDougal, formerly with Westinghouse, is now apparatus sales manager for the Electric Supplies Distributing Co. of San Diego. He was Navy engineering officer during the war, was attached to the Army-Navy Munitions Board in Washington, D. C. and later served aboard an aircraft carrier in the Pacific. He has been with Electric Supplies since January and, according to General Manager Fred G. Goss, will work closely with utility and industrial customers and with Navy and Marine officers on military installations.

● Capt. Ronald T. Strong has rejoined Westinghouse Electric Corp. as manager of the San Diego office. Recalled to active duty in the Navy in January 1941 and assigned to the Amphibious forces in 1942, he later served as supervising beachmaster in the assaults on Attu, Kiska, Kwajalein, Guam and Leyte. He received the Legion of Merit Medal and the Bronze Star.

● Ralph H. Sroufe has been transferred by Westinghouse Supply from Des Moines to Portland as manager. Sroufe started in the electrical wholesaling business in Seattle in 1915, later joined Westinghouse there and from 1941 to 1944 was North Pacific district stores manager.

● Earl W. McBratney last month was appointed branch manager for Westinghouse Supply at Tacoma, succeeding J. R. Wells, transferred to district headquarters at Seattle for special duties.

● Chester W. Jarrett, manager for five years of the Vancouver division of Portland General Electric Co., has been appointed technical street lighting consultant to advise on problems relating to community street lighting projects in PGE territory.

● Charles R. North, district manager for the B. C. Electric Railway Company at Kamloops, B. C., died in the hospital there early in February at the age of 64.

● Elmer E. Jonsson is now Westinghouse Lamp Division representative for the intermountain area, with headquarters at Salt Lake City.

● Following 2½ years in the Navy, Cliff Palmer is back with Associated Wholesale Electric Co., Los Angeles, handling inside sales.

● E. I. Snyder has been appointed Northwest manager for Proctor Electric Co., appliance manufacturers.

TRADE notes

● IN LINE with expansion of electrical industry operations in the Northwest, Underwriters' Laboratories Inc., has established a new office at Portland at 326 N. W. Broadway. R. J. Larrabee, engineer for Underwriters' Laboratories in Seattle, will supervise the Portland office as well as Seattle, and cover both areas. Local inspector at the Portland office is Frank Tracy, formerly of Tracy Fire Equipment Co. The Underwriters' Laboratories was formerly represented in the Portland area by E. B. Morrison, electrical engineer for the Oregon Insurance Rating Bureau, who continues with the bureau in this capacity on a full-time basis.

● WARREN H. STOVER, formerly district representative of General Electric Co.'s air conditioning department in Portland, has been named district manager of the Northwestern sales district. His appointment is in line with General Electric's new policy of dividing the country into ten districts, placing a manager over the field staff of the air conditioning program in each district. Stover, who has been with General Electric for the past eight years, will retain his Portland headquarters.

● AVIOLA RADIO CORP. Phoenix, Ariz., has recently been authorized by the state corporation commission to issue and sell $300,000 worth of stock. Under the permit the corporation will issue for sale 5,450 shares of common stock at $5 per share, and an equal number of shares of preferred stock at $50 per share. Purchaser last month of the surplus AiResearch Mfg., Co., plant, the Aviola Co., reportedly will move its manufacturing facilities from Glendale, Calif., to Phoenix.

● IDEAL INDUSTRIES Inc. was formed on Feb. 1, following termination of the Ideal Commutator Dresser Co., a partnership. No change was made in management, personnel, location or methods, according to announcement of J. Walter Becker, general manager.

● C. BOND BARNEY, Stromberg-Carlson sales representative at San Francisco, attended the company's recent division sales conference in Rochester, N. Y.

● JOSEPH C. PLATT, 1411 Fourth Ave. Bldg., Seattle, has been appointed Warren Telechron representative in Washington and Oregon.

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MALLORY CAPACITORS

Necessary leads, lugs, screws, and nuts are included in each box for any type connectors.

Mallory MSG Capacitor:—Small, compact AC Motor Starting Capacitor that fits almost every mounting bracket or box. Replaces rectangular capacitors with leads, lugs or studs. Each capacitor is packed with complete set of universal mounting hardware and installation instructions.

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Fuses, Oilers, Clip Locks and Fuse Pullers

KNOX PORCELAIN CORP.
Electrical Porcelain

● McLennan McFeely & Prior Ltd., wholesale and retail hardware furniture, sports goods and electrical dealers in British Columbia, is refinancing its outstanding 6½% first preferred share obligation on a 4½% basis. The company operates a chain of retail stores throughout British Columbia and has wholesale branches at Vancouver, Victoria and New Westminster. The 2% reduction in the dividend rate indicates an annual saving to the company of $24,000 on the $1,200,000 issue.

● Essex Wire Corp. and its Paranite Wire and Cable Division have appointed representatives for the Pacific Coast. W. D. Barnes, 55 New Montgomery St., San Francisco, will handle the northern territory, including Oregon, Washington, Nevada and Idaho. John W. Stewart, 1032 Rowan Bldg., Los Angeles, will cover southern California and Arizona. Barnes has represented Paranite in San Francisco for many years. Stewart recently was discharged from the Navy as Lieutenant Commander.

● Cannon Electric Development Co. has appointed Radio Specialties Co., 20th & Figueroa Sts., Los Angeles 7, exclusive distributor in southern California and Arizona for products listed in its Type P, O, X, XK, XL and TQ bulletins.

● Royal Electric Appliance Co. in Olympia Wash., owned by Earl Wilson, has been sold to Fred T. Jones, who disclosed that no changes in company operations are contemplated at present. The firm handles ranges and washing machines.

● Pressed Steel Car Co. has appointed the following Western distributors for its Presteline appliance line: Kinney Brothers, Los Angeles; Pacific Coast Heating & Appliance Co., Seattle; Edward F. Hale Co., San Francisco.

● Wiremold Co.'s contest for electrical contractors and maintenance men closes March 31. Awards will be made for the best detailed description of any Wiremold installation, including layout data, photographs and sketches.

● Youngtown Kitchens has announced two appointments to its field staff in the West: R. S. Mathison, Redwood City, Calif., and F. T. McDonald, Phoenix, Ariz.

● F. L. Sanderson has established a new electrical and refrigeration business at 945 Commercial Drive, Vancouver, B. C.

Keuhlthau

● ELECTROMASTER has announced that W. Alex Keuhlthau will be district manager for Washington, Idaho and Montana and B. G. Sanderson, California district manager. During the war, Keuhlthau was Electromaster's West Coast contact man with Army, Navy and Marine Corps. Sanderson has been in the appliance field since 1934, specializing on electric range and water heater sales.

Sanderson

● J. E. REDMOND SUPPLY CORP. in Phoenix, Ariz., originally the J. E. Redmond Co., manufacturer's agent, formed in 1928, has recently incorporated with a capital stock of $200,000, and will handle electrical installations and equipment. Leased office and warehouse space of the concern will comprise 12.000 ft. President of the company is J. E. Redmond, and the secretary-treasurer is James T. Deppe, former purchasing agent for Central Arizona Power & Light.

● HAROLD R. STEWART has been made British Columbia manager for Moffats Ltd., electric range and appliance manufacturer. He has been in the electrical appliance merchandising field on the lower B. C. mainland for 15 years, previously with B. C. Electric.

● TO ALLOW the main floor to be devoted entirely to display purposes, Leo J. Meyberg at Los Angeles will move its executive offices to balcony space being constructed for that purpose.

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Lugs, Tees, Service Connectors, Grounding Clamps, Straight and Parallel Connectors, Elbows, Cable Taps, etc., etc.

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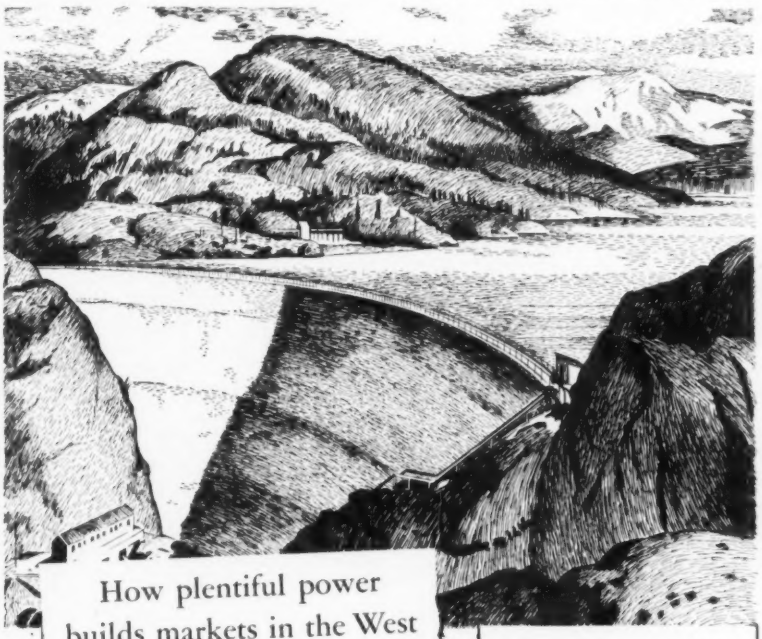
PROFILES *of the month*

Joe Platt, left, former Hotpoint representative in the Northwest, is now representing Mitchell and Warren Telechron in that territory. His offices are at 1411 Fourth Ave. Bldg. in Seattle

Four finalists in Westinghouse Science Talent Search are shown below, with Charles A. Dostal, vice-president in charge of the company's Pacific Coast district. These finalists from the San Francisco Bay Area were to compete in Washington, D. C., March 1-5, for top awards. They are from left: Elaine Carlotta Jones, 17; James Shields, 16; David Dill Cudaback, 17, and Elizabeth Roemer, 16. The Science Talent Search is sponsored by Science Clubs of America under Science Service, and the scholarship awards are made by Westinghouse Educational Foundation

Advanced by Westinghouse Supply Co. at Salt Lake City were (from left below) R. L. "Bob" Nichols Jr., J. A. Maughan and A. B. "Art" Darby. Maughan was made branch apparatus and supply manager; Nichols, returned after four years of Army service, has been named sales promotion manager, and Darby, for three years with the Army Ordnance, is newly appointed branch appliance manager

NORTHERN CALIFORNIA...one of the nation's most abundant sources of electric power



How plentiful power builds markets in the West

More than half of all the hydroelectric power in the United States is generated in the West. Thirty-seven billion kilowatt-hours annually.

And one important result is... better markets for your products.

Western housewives, for example, buy far more home appliances than average housewives. Seventeen per cent more of their homes are wired for electricity, and their standards of living are consequently higher. Western farms use nearly three times as much electricity as average farms, California alone accounting for more than half the country's entire rural consumption.

So plentiful power helps build western markets just as it helps lower manufacturing costs, and nowhere in the West is power more plentiful than in Northern California. Here, the Pacific Gas and Electric Company's vast interconnected generating system has a capacity twice that of Boulder Dam, and 60 per cent greater than Bonneville and Grand Coulee combined. Rates are among the lowest in the nation.

If power is important in your business, either in creating a market or in producing for one, investigate the advantages of locating in Northern California. The Pacific Gas and Electric Company will be glad to help you in every way possible.

Northern California...industrial center of the new Pacific World

PACIFIC GAS AND ELECTRIC COMPANY

P. G. and E. engineers will help you locate your plant

A well-trained Pacific Gas and Electric Company engineering staff has been built solely to help industrial firms learn the facts about locating in Northern California. This staff works closely with established agencies throughout the entire area, and its service includes at no charge. .

A thorough study of available sites; photographs, maps, aerial perspectives.

Complete information on environment, transportation, drainage... trucking and freight rates.

Estimated cost of property, of any necessary improvements, of power and other utilities.

For more information, or assistance of any kind, write Pacific Gas and Electric Company, San Francisco 6, California.

POWER... *to Pace the Future*

Electric energy, the "White Coal" of the West, has been an important factor in the challenging growth and prosperity of Northern California. The abundance of this electric power, its widespread distribution at rates among the lowest in the nation, have fostered a live demand for a great diversity of products for the home, farm, factory and business. A dependable supply of hydro-electricity has helped make Northern California one of the richest markets in the Nation.

You, who use electric appliances in your homes and constantly add to this family of mechanical servants, are that market. You buy and use far more electrical appliances than folks elsewhere in the country and you can do so because electricity is convenient and cheap. You, who have farms in Northern California, use more than half of the Nation's entire rural power load. You have complete electric service in your farm home, in the fields and barns. And you, like Northern California business and industry, use electricity to help lower your production costs.

Low cost electric power, and lots of it, has been a builder of markets in Northern California. It took the heavy demands of wartime industries in stride and is ready now to pace the future.

This is the fourth of a series of Pacific Gas and Electric Company advertisements to attract new industry to Northern California. It will appear in Time and the Saturday Evening Post.

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

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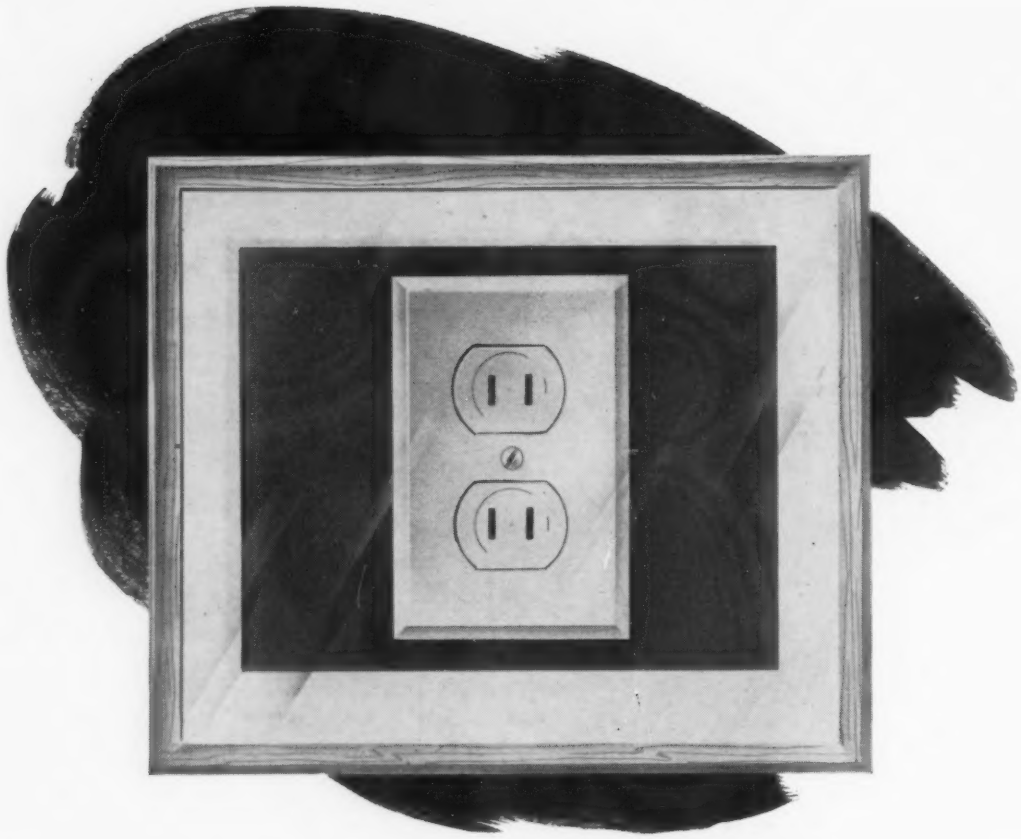

Picture of a
DOUBLE-BARRELLED OPPORTUNITY

NINE HOUSES OUT OF TEN today do not have adequate electric wiring nor enough convenience outlets.

Yet most home owners want to take full advantage of modern, postwar electrical appliances.

Here then, is the double-barrelled opportunity for the electrical industry: first, to modernize the wiring systems of these thousands of homes. Second, to sell the new electrical appliances.

Now is the time to concentrate on the job of selling adequate wiring. Every electrical outlet you install now is a potential outlet for appliance sales later.

PACIFIC COAST ELECTRICAL ASSOCIATION

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